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CONTENTS

Conditions Simulating Appendicitis,
Frank G. Slaughter, M.D., Jacksonville 265

Rickettsial Diseases in the South,
Jack O. W. Rash, M.D., Miami 270

The Public Health Control of Gonorrhea,
L. C. Gonzalez, M.D., Jacksonville 286

Three Cases of Cancer in Children Under Three Years of Age,
Henry E. Palmer, M.D., Tallahassee 289

Editorials: Preconvention Meeting; Medical Division of
Civilian Defense Issues Bulletin No. 2 293

Medical District Meetings 294

Births 296

State News Items 296

Component County Societies 297

Abstract Department 298

Books Received 300

Advertisers' Notes 300

Woman's Auxiliary 302

Index to Advertisements 304

State and Sectional Meetings 306

Component Societies by Districts 307

NEXT SESSIONS

American Medical Association, Atlantic City, 1942
Southern Medical Association, Richmond, November, 1942
Florida Medical Association, Palm Beach, April 13-15, 1942

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CONDITIONS SIMULATING APPENDICITIS

FRANK G. SLAUGHTER, M.D.
JACKSONVILLE

To discuss all the causes of abdominal pain on the right side would be a task bordering upon the herculean. It is not my purpose in this paper to discuss such intraperitoneal and extraperitoneal factors, but rather to direct attention to several conditions seldom considered in differential diagnosis which may closely resemble or even be clinically indistinguishable from appendicitis. Specifically, I shall discuss acute and chronic mesenteric lymphadenitis, hemorrhage from the ovaries associated with ovulation and the rupture of the corpus luteum, regional ileitis and parasitic disease of the intestine, particularly amebiasis.

Acute mesenteric lymphadenitis is a disease of children and young adults, characterized by swelling of the mesenteric lymph nodes, particularly those of the lower portion of the ileum. It constitutes a definite clinical entity, which is usually not recognized until an operation for acute appendicitis is performed. When its presence is considered, diagnosis can frequently be made before operation. Why the lymph nodes of the mesentery should become swollen and inflamed is not clearly understood. Certainly there is some relation to infection of the lymphoid tissue elsewhere in the body, and some observers believe that enlargement of the mesenteric nodes is merely part of a general lymphatic involvement. In support of this theory there is the frequently observed fact that in children with enlargement of the mesenteric nodes there is likely to be involvement of the tonsils and lymph glands of the neck. There appears, however, to be some causal relationship between the appendix and the involved mesenteric nodes since concurrent disease of the appendix occurs frequently. It would also appear that other factors related to the intestine itself, such as stasis, ptosis and faulty function of the intestine, play a part. This observation is substantiated by the work of Arnold,[1] who demonstrated that great changes could be obtained in the flora of the intestinal canal merely by changing the hydrogen ion concentration of the intestinal contents, by feeding a protein meal or adding other food substances, and even by changing the temperature of the room. He showed that many organisms penetrate the walls of the intestine, to be destroyed in the lymph nodes and in the liver. It would appear, then, that minor changes in the intestinal contents may subject the mesenteric lymph nodes to attack by a host of organisms which might easily cause the enlargement noted in acute mesenteric lymphadenitis.

The symptoms of acute inflammation of the mesenteric lymph nodes closely simulate those of appendicitis, and this disease may be clinically indistinguishable from it. The child begins to complain, rather suddenly, of generalized abdominal pain which tends to localize in the right lower quadrant of the abdomen, but not quite to the extent usually found in appendicitis. Abdominal pain in children is, however, notoriously deceptive; so too much significance cannot be attached to this symptom. There may or may not be nausea and vomiting. The temperature tends to rise higher than in appendicitis, and the white blood count is rather high, frequently being from 18,000 to 20,000. The child does not appear to be as sick as would be expected with such a count from appendicitis, and on examination the tenderness is more diffuse, and there is less tendency to rigidity. A sign which has been noted by some observers is that of tenderness diagonally upwards and to the left from McBurney's point along the course of the mesentery of the small intestine.

In five cases of mesenteric lymphadenitis the patients have been operated upon at the Riverside Hospital in the last four years. The report of one case, which was typical, follows:

Case 1. J. K., a boy aged 5, was first seen on June 6, 1940. He had been well until about two hours before admission,when he suddenly began to complain of severe abdominal pain, but did not vomit. When it was discovered that he had fever, he was brought to the hospital.

Physical examination revealed a temperature of 102.4 F.; the pulse rate was 120 and the respiratory rate was 20. The pharynx appeared to be normal. Examination of the abdomen was difficult because of great voluntary rigidity. The impression was gained that even light palpation in the right lower quadrant caused discomfort and

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the patient tended to lie in his mother's arm with knees drawn up. The white cell count was 11,250 with polymorphonuclears 85 per cent.

A diagnosis of acute appendicitis was made. At operation the entire lower portion of the ileum and the cecum, including the appendix, were red, the vessels were injected and there was evidently an acute process involving this entire area. The mesenteric glands of the ileum, the appendix and the first portion of the cecum were enlarged, one gland being as large as one's thumb. The appendix and one enlarged gland were removed.

The postoperative course was uncomplicated. The temperature subsided slowly and reached normal on the fifth day.

The pathologist's report revealed that the wall of the appendix contained a variety of inflammatory changes with ulcerations, hemorrhages and infiltrations by inflammatory cells. The vessels of the serous coat were distended and engorged. The tissue of the lymph gland contained hyperplastic follicles. The diagnosis of the pathologist was acute catarrhal appendicitis and hyperplastic lymph node.

The finding in this case of what appeared to be a grossly normal appendix which on microscopic examination showed definite inflammatory changes is a common occurrence. Various observers noted such microscopic evidence of disease of the appendix in as high as 90 per cent of the cases of mesenteric lymphadenitis. It must be remembered that there is a preponderance of lymphoid tissue in the appendix itself. It is therefore reasonable to suppose that the acute changes noted in the appendix are only a part of the general lymphoid involvement, rather than a primary cause. Certainly few of these enlarged nodes are tuberculous as was formerly thought to be true.

It is likely that many cases ordinarily diagnosed as chronic appendicitis are really cases of chronic mesenteric lymphoid enlargement, or certainly recurrent mild attacks. The report follows of a case that illustrates this conclusion well.

Case 2. R. B., a boy aged 10, for several years had been having recurrent attacks of generalized abdominal pain with nausea and sometimes vomiting. He was seen in several attacks, the temperature usually being about 99.6 F. and the tenderness mild and not localized. The highest white cell count was 8,100 with polymorphonuclears 44 per cent. Attacks continued, becoming so frequent that he was out of school most of the time. The family was advised that an appendectomy should be performed as a prophylatic measure.

On Dec. 4, 1940, the patient was operated upon. The appendix was short and rather boggy, but was not tied down by adhesions. It was hanging free in the peritoneal cavity. The lymph glands of the mesentery and terminal portion of the ileum were noticeably enlarged, several being the size of one's thumb. The appendix was removed.

The postoperative course was normal. There was a rise in temperature to as high as 99.6 F. during the first twenty-four hours.

The pathologist reported that the mucous membrane of the appendix was marked by diffuse and small hemorrhages, some of them occurring in the deep follicles, which were very large. A diagnosis of subacute ulcerative appendicitis was made.

Since the operation this child has been completely rid of pain. Statistics show that as many as 40 per cent of the cases of this type are relieved following appendectomy; operation is, therefore, indicated in the absence of grave contraindications.

Hemorrhage from the ovary often presents a picture which is confused with that of appendicitis. Two general causes of ovarian hemorrhage must be considered. The first is that occurring at the time of ovulation when bleeding varying in amount may occur through the stigma where the ovum escapes from the graafian follicle. The second condition is rupture of the corpus luteum with attendant hemorrhage.

Most physicians are familiar with the clinical picture of blood in the peritoneal cavity, particularly the pelvis. There occurs generalized abdominal pain, frequently associated with nausea and vomiting, with tenderness low down in the abdomen, leukocytosis and some fever, and a rapid blood sedimentation rate. The symptoms are usually most intense in the right lower quadrant of the abdomen, and tenderness is greater on the right side. On pelvic examination the clot-surrounded ovary may be felt as a vague mass which strongly suggests ectopic pregnancy.

Hemorrhage occurring through the stigma at the time of ovulation is liable to be slight, and symptoms are usually mild. By keeping in mind the time relationships in the menstrual cycle, one can usually determine whether it is with ovulation, or with rupture of a corpus luteum that one is dealing. What appears to be a mild appendical attack occurring at approximately the middle of the menstrual cycle may well be from rupture of a follicle and should always be regarded with suspicion. Cases of this kind require operation for closure of the point of rupture only in exceptional instances. The mildness of the symptoms, the rapid subsidence of the white cell count and temperature, and the tendency of the sedimentation rate to be rapid usually make the diagnosis certain. Careful analysis of the history is essential.

Rupture of the corpus luteum usually occurs just before or in the first days of menstruation. It is liable to cause symptoms much more severe than those occurring with ovulation. The amount of blood is usually greater and occasionally a hemorrhage of alarming proportions occurs. There is usually a history of trauma, followed by intense pain in the pelvis and lower part of the abdomen with a varying amount of shock, some-

times resembling that of rupture of an ectopic pregnancy.

The lack of definite localizing signs, the presence of some evidence of shock and particularly the appreciable increase in the sedimentation rate all suggest hemorrhage into the pelvis. When a fairly certain diagnosis can be made and there is no gross evidence of shock, it is better to treat the patient conservatively since only occasionally is the hemorrhage really dangerous. If, however, a reasonable doubt exists, it is always better to operate to rule out the appendix. Removal of the bleeding ovary should be avoided if at all possible. In practically every case it is possible to strip out the cyst of the corpus luteum and close over the bleeding area, or in extreme cases a segmental resection can be done. Nothing is to be condemned more than the practice of needlessly sacrificing the ovaries of young women to the "furor operativus."

There follows the report of a case illustrative of hemorrhage from a ruptured graafian follicle:

Case 3. Mrs. J. A., aged 23, was admitted to the hospital on April 11, 1939, complaining of severe generalized abdominal pain beginning four hours before admission and associated with nausea and vomiting. The pain shortly became localized in the right lower quadrant of the abdomen. The last menstrual period had occurred exactly fourteen days before.

On examination, the temperature was 99.4 F. The pulse rate was 100 and the respiratory rate 20. The blood pressure was 110 systolic and 70 diastolic. There was a considerable degree of tenderness in the lower part of the abdomen with rigidity. The white cell count was 24,600 with polymorphonuclears 90 per cent. It was suspected that this might be a condition other than acute appendicitis, and operation was advised.

At operation it was revealed that the abdominal cavity, chiefly the right lower quadrant and the pelvis, was filled with fresh blood and an old clot. The cause of the hemorrhage was a hemorrhagic cyst on the right ovary, possibly from a ruptured graafian follicle or from a rapidly developing corpus hemorrhagicum. The appendix was removed, the hemorrhagic cyst of the right ovary was excised and the defect was closed with a continuous suture.

Another case presented a similar picture, with the appendix secondarily inflamed from peritoneal irritation and a hemorrhagic cyst on the ovary with old blood in the pelvis. It is interesting that in the case reported a large hemorrhage occurred, possibly from rupture of a graafian follicle, without the patient experiencing much shock. Such a severe hemorrhage is rare.

The acute stage of nonspecific granuloma of the intestine, represented familiarly by the entity known as regional ileitis, occurs infrequently and is usually not recognized when seen. In the more advanced state, however, this disease may present a syndrome which almost exactly parallels that of abscess of the appendix, and the patient is often operated upon for this condition. The differential diagnosis is here of vital importance since the usual treatment for regional ileitis is resection of the involved portion of the bowel, a procedure requiring suitable preoperative preparation.

The case reported below illustrates how what appeared to be an idiopathic granuloma simulated acute appendicitis:

Case 4. D. C., a man aged 42, was admitted to the hospital on June 5, 1939, complaining of acute abdominal pain of twenty-four hours' duration localized in the right lower quadrant of the abdomen, in which region there was great tenderness. He had experienced no nausea or vomiting. There had been several previous attacks of a similar nature.

On admission, the patient's temperature was 103.4 F. The pulse rate was 96 and the respiratory rate 22. The blood pressure was 150 systolic and 90 diastolic. Examination revealed a large draining carbuncle on the neck, great tenderness and spasm in the region of McBurney's point, and rebound tenderness to this area. The white cell count was 28,000 with polymorphonuclears 92 per cent. A diagnosis of acute appendicitis was made, and the patient was operated upon.

The appendix was acutely inflamed. On the wall of the cecum about 2 inches distal to the appendix there was an area of leathery induration the size of a silver dollar. The terminal portion of the ileum was normal. The appendix was removed.

The pathologic report included a diagnosis of acute ulcerative appendicitis.

Following the operation the patient had several bloody stools, but all of the abdominal discomfort cleared up after a few days. He has not been seen since.

In this case there appeared to be an acute manifestation of a nonspecific intestinal granuloma because, although highly inflamed, the appendix presented the picture of involvement secondary to another process. This process may have gone on to formation of a granuloma, although this type of tumor occurs rarely in the cecum itself. Since the case could not be followed, its ultimate termination is of course unknown.

In another case there appeared to be an abscess of the appendix, but the possibility of regional ileitis was kept in mind. At the operation, the involved area of the ileum and cecum was freed and brought out through the incision in the first stage of a Mikulicz procedure, the operation being subsequently completed in the usual manner.

Infection by intestinal parasites, notably hookworm infestations, may present the picture of a mild appendicitis or recurring attacks of pain in the lower part of the abdomen, which strongly suggest recurrent involvement of the appendix. In these cases the patient may be operated upon for chronic appendicitis.

Invasion of the appendix by Endamoeba histolytica may produce a syndrome resembling acute appendicitis, but is more likely to simulate a chronic form of appendical involvement. Operation in these cases may be attended with disastrous consequences, and for this reason, as well as to rule out other parasites, careful examination of the stool should be made in all cases which are not typical of acute appendicitis. Craig stated: "A majority of the deaths occurring during the Chicago epidemic of amebiasis were in patients operated upon for supposed appendicitis."

SUMMARY

1. Acute and chronic mesenteric lymphadenitis may present a clinical picture closely resembling appendicitis. Since the appendix seems to be diseased, if not actually the causative factor in a large number of the cases of this disease, operation should be performed in the absence of contraindications.

2. Hemorrhage from the graafian follicle and from rupture of the corpus luteum often produces the syndrome of pain in the right side of the abdomen, nausea, vomiting, tenderness, rigidity and leukocytosis, simulating appendicitis. Differential diagnosis is here very important, because in only a few of these cases is an operation demanded. Careful analysis of time factors with relation to menstruation aids in making the diagnosis.

3. The acute stage of nonspecific intestinal granuloma may be clinically indistinguishable from appendicitis.

4. Intestinal parasites, especially E. histolytica, should always be considered in the diagnosis of questionable involvement of the appendix.

REFERENCE

1. Arnold, L.: Bacterial Flora Within Stomach and Small Intestine; Effect of Experimental Alterations of Acid-Base Balance and of Age of Subject, Am. J. M. Sc. **186**:471-480 (Oct.) 1933.

2033 Riverside Ave.

DISCUSSION

DR. EDWARD JELKS, Jacksonville: Obviously fifteen minutes is too little time for an essayist to cover the subject which Dr. Slaughter has discussed. He suggested that I add another frequently occurring syndrome which is often thought to be appendicitis. So, I should like to consider the question of diverticulitis as it confuses the surgeon and diagnostician when appendicitis is the probable cause of a patient's trouble.

Most of the patients that he mentioned were young people. Diverticulitis occurs usually in older persons.

There are two important reasons for recognizing diverticulitis in acute abdominal pathologic conditions. The first is that most of the patients with this disease should not be operated upon at all. The second is that when the surgeon opens the abdomen, he often finds a condition which he may be tempted to attack surgically. Frequently this surgical intervention does more harm than good. Dr. Slaughter and I have been mistaken several times in the preoperative diagnosis and have found at operation an abscess secondary to diverticulitis. Some abscesses should be drained, and some certainly should not be touched. The chief objection to drainage is the danger of a sinus developing that may persist a long while or remain open permanently.

It is understandable that some of the inflammatory conditions of the sigmoid and left portion of the colon are sufficiently confusing to lead the surgeon to perform an operation. One reason for the mistake in diagnosis is that an inadequate history has been obtained. If the condition is diverticulitis of the sigmoid, usually some abdominal distress is present several hours before a physician is called. There may be definite localized pain and tenderness in the right lower quadrant of the abdomen owing to the distention of the cecum, which is secondary to the pathologic process in the left portion of the colon. Of course fever and leukocytosis in a situation of this sort make a clinical picture very much like that of appendicitis.

I should like to report three cases of diverticulitis, demonstrated by slides, which so puzzled us that we made incorrect preoperative diagnoses. In all three we thought before we saw the actual condition that the patients had appendicitis.

The first patient was a man 21 years old, who had been sick for forty-eight hours. When he came to the hospital, there was a good deal of general abdominal distention, so much so that it was impossible to localize definitely the tenderness. The process, however, seemed sufficiently definite for us to make a McBurney's incision. Through this we found a normal appendix. A right rectus incision revealed a section of the small bowel caught in a loop made by a Meckel's diverticulum, the tip of which was attached to the base.

The second patient was a man of 56 years, who said that while sitting on his front porch the night before he had been attacked suddenly with epigastric pain and vomiting. When he awakened the next morning, the pain was definitely localized in the right lower quadrant of the abdomen. The white blood count was 10,000. There was definite tenderness over the right lower quadrant. The temperature was 99 F. plus. Appendicitis appeared to be his trouble, but at operation the appendix was normal. Two diverticula, one of the cecum and one of the ascending colon, were found. Both were greatly inflamed.

The third patient was a woman of 58, who had had pain in the right side of the abdomen for five or six days. The leukocyte count was increased. The pain was localized over the right lower quadrant of the abdomen and there was also tenderness in that area. At operation one inflamed diverticulum budding from the cecum near the base of the appendix was present. The appendix appeared normal.

Dr. Slaughter has mentioned the fact that sometimes in ileitis it is difficult to be sure whether or not the patient has appendicitis. A man in his late thirties came to us last year with the complaint of pain in the right side of the abdomen and some epigastric discomfort. Six months and also six weeks previously he had had rather severe attacks resembling appendicitis. When he came to the hospital he had a mass in the right lower quadrant of the abdomen, which was moderately tender. The leukocyte count was 11,000, and the temperature 100 F. Although an abscess of the appendix seemed the most probable explanation of his trouble, a barium enema was given and a roentgen study made, which revealed an unusual defect in the cecum. The roentgenograms presented a picture not characteristic of malignant neoplasm. It was so atypical that some irregularity caused by an infectious process seemed most likely. We

operated with the idea of draining an appendical abscess and found within the abdomen about 12 inches of the ileum, which was greatly thickened and lying laterally against the cecum. This portion of the ileum was encroaching upon the lumen of the cecum in the manner shown by the roentgenograms.

There are a great number of conditions in the abdomen which simulate appendicitis. I am sure that most practitioners see them and are confused as to what they are and what should be done about them. In spite of all that has been studied, said and written about appendicitis, it still is a subject with surprises and enduring interest.

DR. I. M. HAY, Melbourne: In the appraisal of a patient with a condition resembling appendicitis one should be guided by the important factors of age and sex in the amount of study given to diagnosis, especially in those cases presenting a palpable tumor.

In children, masses are much more frequently encountered, and a diagnosis should be well established. Many unnecessary operations are performed for nonspecific mesenteric lymphadenitis. Also, the speed of the formation of an abscess is more rapid, so that retroperitoneal drainage may be done. In the absence of a palpable mass, operation should certainly not be delayed as the infection proceeds more rapidly in children.

During middle age, the diagnosis in men is more simple, and masses are more rarely encountered. But in women exhaustive differentiation should be made. Again in the aged, masses are more often encountered. Here delay is more dangerous, and one should explore on less positive diagnostic findings. The aged person cannot stand long periods in bed. In this regard the wound should be sutured strongly enough to allow early mobility. In these cases the use of buried steel wire should be considered.

I wish to congratulate Dr. Slaughter on this timely paper.

DR. J. SAM TURBERVILLE, Century: I hesitate to say anything, but I have seen three times in my life suppurative mesenteric lymphadenitis. Usually cases in which this condition occurs are incorrectly diagnosed. I have seen three acute cases; in all the mass was slightly to the left of the midline at about the level of the navel. I saw one subacute case, and this time the mass was to the right of the midline and above the navel. In the acute cases when the patients were operated upon, a left transrectus incision was made. At operation in the subacute case, a right rectus incision was made.

I should also like to direct attention to pain from hemorrhage of the ovary. A curious finding is that bleeding from the left ovary often causes pain in the right side. I have no idea why this is true. I think cases of this kind should be observed closely to see if an explanation can be found. Another disease that causes confusion in acute abdominal conditions is infection by intestinal parasites. I have seen many pinworms in an appendix, and occasionally a hookworm.

I once confused invasion by roundworms with appendicitis, and once with obstruction of the bowel. When the state of the appendix does not justify the diagnosis, occasionally it is found that pinworms or hookworms are causing the symptoms.

DR. T. H. LIPSCOMB, Jacksonville: Most of the conditions simulating appendicitis have some atypical symptoms. I am speaking from the standpoint of the roentgenologist for I believe he can be helpful to the surgeon in a number of confusing cases of this sort.

I think that instead of referring the patient for study following a barium enema, the surgeon ought to say to the roentgenologist, "I have a patient who has symptoms something like those of appendicitis in the right lower quadrant of the abdomen, but I am not sure what the trouble is and I should like for you to examine him." The roentgen examination can be helpful in regional ileitis, in diverticulitis and in pain of ovarian origin, but it should not be limited simply to that contingent on a barium enema. I feel that the roentgenologist has not rendered the patient and the surgeon the best aid unless the examination includes the more complete study that follows administration of barium both orally and by enema.

In the slides Dr. Jelks showed the regional ileitis might have been detected if the barium had been given by mouth and the patient had been examined when the barium was distributed partly in the small bowel and partly in the large. The appendix, if it is perfectly normal, fills with barium from one route or the other and can be moved about freely depending upon its length. Regional ileitis frequently occurs in the terminal portion of the ileum and may be as close as 1 or 1½ inches from the appendix. One can press over the terminal section of the ileum and elicit reflex rigidity, pain and tenderness, and the appendix can be moved about freely without pain. Definite differentiation between these two conditions is thus possible.

The presence of diverticulitis also can be demonstrated to better advantage by the oral administration of barium rather than by a barium enema. If the enema alone is given, it certainly should be of the double contrast type. In some instances stereoscopic roentenograms should be made.

In most cases of ovarian or tubal irritation the pain and tenderness are medial to the cecum and appendix.

I would urge that in these cases the roentgenologist be given a chance to help.

DR. ALLEN P. GURGANIOUS, Palatka: Two cases have come under my observation within the last year that were somewhat unusual in my experience. One case of an acute surgical condition of the abdomen I felt sure was a case of acute appendicitis in a man 32 years old. He had been out working and had bruised himself internally. About 4 a. m. he came to the hospital with acute symptoms. The white cell count was about 20,000, as I recall. Operation revealed a carcinoma of the cecum. The bruising had apparently caused inflammation, and the disease had in consequence flared up. A biopsy proved the diagnosis.

In the other case the patient, a girl aged 16, had acute cecitis. I should like for Dr. Slaughter to mention this condition when he concludes the discussion. The appendix in this case was normal, but the area all around the cecum was acutely inflamed, and the whole peritoneum was acutely injected. Somewhat unusual was a large mass of fecal matter in the cecum which could be lifted out during manipulation to find the appendix.

Two cases, of course, do not justify drawing conclusions. The patient with the carcinoma of the cecum is still living despite extensive development of the disease. In the other case, the girl of 16 made an uneventful recovery.

DR. HERBERT E. WHITE, St. Augustine: I was much interested in the discussion of regional ileitis. I want to mention one diagnostic point, namely, that in the presence of appendicitis there is muscular rigidity. In regional ileitis muscular rigidity is not present.

DR. SLAUGHTER (concluding): Before answering the questions I should like to express my appreciation to Dr. Hay and to Dr. Jelks. I am glad that this paper has provoked discussion because this question I think surely has a great many possibilities.

Dr. Jelks and I agreed that if I did not discuss diverticulitis, he would. It is not unusual for diverticulitis to cause symptoms of appendicitis with pain in the right lower quadrant of the abdomen. Drainage of the diverticula often causes fistulas to develop, not one of which has been closed without a great deal of trouble in the cases I have observed. Most of them are still draining. Of course, as Dr. Jelks brought out, it is better not to operate in these cases. There may be a fistulous tract which it is impossible to close. Because of the location, surgical access to the diverticulum is difficult in most instances. Everything gets cemented down in one place and makes closure well nigh impossible.

The question of ileitis is not one that should be brought up here except to mention that if a reasonably satisfactory diagnosis of this disease is made in time,

trouble may thereby be avoided by not removing the appendix. It is not always possible, however, to tell. We operated on one patient, a man with granuloma of the cecum, and did not get into trouble. In a large number of the cases of regional ileitis fistulas develop after appendectomy.

Dr. Turberville's remarks on mesenteric lymphadenitis are particularly interesting. He presented a question that I did not have time to go into. One or two writers have tried to evaluate the relationship of general infections, such as pharyngeal infections in children, to these mesenteric enlargements. In perhaps 40 per cent of the cases there is a pharyngeal infection. Thus the question arises as to how dangerous it is to remove the nodes for a specimen. We removed one in one case, but since studying the subject I feel certain that we will not remove others. There have been cases of severe infection following the removal of the node. Cultures in some instances showed infection by streptococci.

I do not share Dr. Lipscomb's enthusiasm for roentgen studies, that is, in the diagnosis of regional ileitis. But one cannot argue with the roentgenologists. They come back with uncontradictable evidence. This examination may be helpful at the time, but the surgeon spends the first week after operation getting the barium out of the patient. The roentgenologist, of course, is spared that particular difficulty. Undoubtedly it is of great value, and I do not underestimate it.

As to hemorrhage in the pelvis with the presence of pain in the shoulder, hemorrhage in the peritoneal cavity frequently is associated with pain in the left shoulder. I do not know why it is more noticeable in the left shoulder. This question of bleeding in the pelvis causing pain in the shoulder could be studied for a long time. Evidently there is a reason, but I am not a competent authority for I hear complaint of so much pain in the right side of the abdomen that I cannot explain. It may be caused by something in the nervous system, but there one might get into trouble with the neurologists.

Dr. Gurganious' question of cecitis was interesting indeed. I feel that his case was not one of granuloma such as I described.

RICKETTSIAL DISEASES IN THE SOUTH

JACK O. W. RASH, M.D.
MIAMI

The rickettsial diseases, or that group which includes endemic typhus fever and Rocky Mountain spotted fever, are of great interest to clinicians in the South because of their increasing incidence in this section and the diagnostic difficulties which they sometimes present. They are practically worldwide in distribution. Some have been known to man for many centuries. It has been stated that wherever man, animals and their ectoparasites exist, this group of diseases is found.

There is no general agreement regarding the exact status of the rickettsias in biology, but, according to Pinkerton,[1] "they are morphologically small, pleomorphic, and bacterium-like, occupying an intermediate position between the typical bacteria and the heterogeneous group of so-called filterable viruses. They differ from bacteria in that they can grow only within living cells, and in this respect they resemble the filterable viruses. They resemble typical bacteria in that they are too large to pass through filters of certain size through which filterable viruses can pass." The bacterium that most closely resembles the rickettsias in vectorial distribution is Bacterium tularense, yet it does not produce a distinct, self-limited disease in experimental animals as the rickettsias do. Wolbach[2] defined the rickettsial diseases as "a group of self-limited, specific, non-infectious diseases, transmitted by arthropods and characterized by continued fever and a rash. The pathology is chiefly in the blood vessels and the lesions there are occasioned by the actual presence of the micro-organisms and not by diffusible toxins."

Since the purpose of this paper is to discuss these diseases as they occur in the South, only when it is necessary to present interesting data in the evolution of knowledge of the rickettsial diseases will a passing reference be made to the group occurring in other sections.

Two rickettsial diseases in the South have been well described. The first, endemic or murine typhus fever, immunologically similar to louse-borne epidemic typhus of the Old World with certain minor variations, but epidemiologically different, has been well known for several years. Endemic typhus apparently has a similar relation to Brill's disease, a sporadic type of typhus that occurred along the Eastern seaboard and which has all but disappeared in the last decade. Secondly, Rocky Mountain spotted fever, according to recent evidence, bears a close similarity to the disease that is known in the Mountain area of this country by the same name, but has rather wide variation in virulence according to local geographic distribution. The disease is immunologically similar to the Sao Paulo typhus of South America and the *fievre boutonneuse* of the Mediterranean area.

A third disease, defined as clinically and immunologically similar to an entity recently described in Australia as Australian Q fever, has been reported[3] in a laboratory worker. This disease has only tentatively been accepted as a rickettsial disease, as there are variations in its bacteriology from the criteria heretofore set up for the rickettsial group. The disease has not been reported in the South, but because of the possibility of its existence here, it is reviewed in brief.

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HISTORICAL REVIEW

Outbreaks of epidemic typhus up and down the Eastern seacoast have been known for over a century. These epidemics were apparently not confined to the coastal areas, for Gerhard[4] stated that during the outbreak in Philadelphia in 1812-1813 the disease "overran a considerable portion of the Middle States, causing extensive ravages in town and country." He wrote that the epidemics began in March and continued until August. This contrast to the seasonal occurrence of Old World typhus in the winter, suggests the disease at that date may have been in a transitional stage, exhibiting the epidemic occurrence of Old World typhus, but presenting the seasonal prevalence as well as the urban and rural distribution of endemic typhus. He noted the chief occurrence of the disease in the poor and overcrowded, the high incidence in the negro, and a mortality rate of about 20 per cent for white persons as compared with 40 per cent for negroes. This author was the first to distinguish clearly between typhus and typhoid.

Rocky Mountain spotted fever was reported along the Snake River Valley first in 1873, although it was probably known in the West many years before. Smith and Kilborne[5] reported the transmission of Texas cattle fever by ticks in 1893. Theirs was the first account of tick-borne disease.

Maxey,[6] in 1899, was the first to describe Rocky Mountain spotted fever. He noted the seasonal appearance of the disease and its predilection for persons in outdoor life who frequented the mountains and adjacent areas. His description is generally accurate: "Spotted fever may be defined as an acute, endemic, noncontagious, but probably infectious febrile disease, characterized by a continuous, moderately high fever, some arthritic and muscular pains, and a profuse petechial and purpural eruption in the skin, appearing first on the ankles, wrists, and forehead, but rapidly spreading to all parts of the body." In 1902, the disease was reported in the Bitterroot Valley of Montana. McCalla[7] in 1905 produced Rocky Mountain spotted fever in two volunteers by the bite of an infected tick removed from a patient. Howard Taylor Ricketts[8] achieved the first experimental transmission of a rickettsial disease to laboratory animals with the rickettsia of Rocky Mountain spotted fever in 1906. That same year he[9] proved that the wood tick, Dermacentor andersoni, transmitted the disease, and demonstrated infected ticks in nature. The hereditary passage of the virus from one generation of ticks to the next via the egg was also demonstrated by Ricketts[10] in 1906. King[11] in 1906 produced the disease independently in guinea pigs via the bite of an infected tick.

Ricketts[12] in 1911 described the micro-organism of Rocky Mountain spotted fever in man, guinea pigs, monkeys and ticks. A year later Ricketts and Wilder[13,14] demonstrated transmission of Mexican typhus by the louse, described the microorganism of the disease in man and the intestinal contents of infected lice, and, by cross immunity tests, demonstrated that typhus and Rocky Mountain spotted fevers are two distinct clinical entities. Howard Taylor Ricketts died in Mexico in 1910 from typhus, while studying the disease. De Rocha Lima proposed a fitting tribute to this martyr of medical science by creating the Genus Rickettsia in 1916.

Brill[15] in New York City in 1910 reported a group of cases of "an acute disease of unknown origin" that resembled epidemic typhus fever in clinical appearance, but differed from it in its seasonal incidence, in its occurrence usually in only one member of a household group and in the absence of lice in association with the cases. No fatalities were noted in over 200 cases. In 1911 Brill[16] reported the findings at autopsy of one case and the negative results after injection of infectious material into monkeys, in contrast to the reports two years previously of transmission to monkeys of the virus of epidemic typhus in Europe[17]. He stated at that time that his group of cases probably represented an altered strain of epidemic typhus. In the same year Maver[18,19] reported the experimental transmission from infected to noninfected guinea pigs of Rocky Mountain spotted fever by the dog tick, Dermacentor variabilis, and by Dermacentor marginatus and Amblyomma americanum. Anderson and Goldberger[20] in 1912 claimed that Brill's cases were identical immunologically with Old World typhus.

As to the length of time endemic typhus fever has been present in the South, only a conjecture may be proposed. There is a possible historic relationship between endemic and epidemic typhus. Endemic typhus is probably the older type of the disease. This hypothesis is strongly suggested by the nonsurvival of the in-

fected louse in epidemic typhus, indicating the relatively recent status of this arthropod as a vector, while the rat flea, the chief vector of endemic typhus, survives infection, suggesting its status as an older vector in a more ancient disease. Assuming the endemic type to be the older, it can be thus postulated that the louse originally acquired infection from man, and louse-man-louse passage altered the virus to the epidemic form. Contrariwise, the epidemic disease may represent priority. It presumably may have been transmitted to rats by infected rat fleas that acquired infection from man, and a reservoir was thus established in rats. Repeated rat-flea-rat passage may have altered the virus to the endemic type seen in the rodent reservoirs today.

Gerhard[1] a century ago noted the presence of epidemic typhus in rural sections as well as in cities during epidemics at that date. His observations suggest an early introduction of the virus of typhus by rats and other rodents into rural and urban sections away from the seacoast. Whatever the mode of introduction in the South, there has been a spread of the disease from the coastal areas toward the interior in the last ten years or more, due perhaps in part to the migration of rodents and the increased planting of foodstuffs in this section[21]. At present the disease is both urban and rural in distribution. In some parts of Georgia and Alabama, the rural prevalence is reported to be higher than that of urban centers.

Paullin[22] first described endemic typhus in the South in Atlanta in 1913 and reported 7 cases; his clinical description of the disease was accurate and interesting. Newell and Allen[23] described cases in North Carolina in 1914. McNeil[24] reported its presence in Texas in 1916. Maxcy and Havens[25] made the first extensive survey of endemic typhus in the South in 1923 in Alabama, and chiefly through their efforts attention was called to the not uncommon occurrence of the disease in this area. Maxcy[26] concluded in 1926 from his study of endemic typhus that the "epidemiological characteristics afford no evidence of louse transmission." He noted that many of his cases were in persons associated with places that were inhabited by rodents and suggested that fleas, mites and possibly ticks might carry the disease to man and that rodents acted as reservoirs. This suggestion proved to be correct regarding fleas and mites as vectors and rodents as reservoirs. The ticks he incriminated were possibly observed in cases of Rocky Mountain spotted fever that were confused with endemic typhus at that time. Maxcy,[28] in 1929, noted the disease was most often seen in seaport towns and seldom in the interior or rural districts. The prevalence of the disease in certain interior areas may, however, have been higher at that time than was suspected. Baker, McAlpine and Gill[27] noted that most of the endemic typhus in Alabama was in rural sections in 1935. The rat flea was demonstrated to be a vector of endemic typhus by Dyer and his associates[28] in 1931, as suggested by Maxcy[26] five years earlier.

In 1931, in a study made in several of the Southern states, Rumreich, Dyer and Badger[29] differentiated clinically and epidemiologically an Eastern strain of Rocky Mountain spotted fever and endemic typhus. Cases of Rocky Mountain spotted fever were noted in Virginia, North Carolina, Maryland and states adjacent to the North; those of epidemic typhus were located in Georgia, Maryland and Florida. Following the work of Maver[19] in 1911 with a strain of Rocky Mountain spotted fever from the West, Dyer, Badger, Rumreiche[30] first described an Eastern strain of virus found in the southern part of the United States, borne by the American dog tick, D. andersoni. The virus of the Eastern strain was first identified in the South by this same group[31] and was established in guinea pigs, monkeys and rabbits, initially in 1931. Until this date reports of cases of the disease under the name of Rocky Mountain spotted fever had not appeared in the Southern literature, although it is likely that some cases had previously been described as typhus.

Boyd[32] in 1932 described a case occurring in Alabama in 1931 that clinically resembled Rocky Mountain spotted fever, but its identity as such was not proved. Kemp and Grigsby[33] reported a case proved by cross immunity tests in Texas in 1931. Crutcher[34] reported in 1933 the first case from Tennessee; it occurred in June 1931. Litterer[35] in 1933 reported 6 cases from Tennessee and 4 were proved by animal inoculation; in all 6 cases there was no evidence of cross immunity with endemic typhus. Two cases were reported by Milam[36] in North Carolina in 1934. He stated that 37 cases had been reported from that state in 1933 and that several local physicians

had reported cases of the disease to their colleagues several years before 1932, the year the disease was made reportable. Five physicians stated emphatically to him that they had seen cases of the disease as far back as twenty years previously. Snider, Dare and Caudill[37] reported a case in Kentucky in 1939 and noted that the disease had first been reported there in 1934. Nine cases have been reported there since that date. A review of the cases occurring in Tennessee to date was written in 1939 by Lumsden and Tucker;[38] they stated that 57 cases had been reported since 1931. Two cases of Rocky Mountain spotted fever with one death were reported from Florida in 1934; no others have been reported. From 1928 through 1939, 716 cases of endemic typhus with an average fatality rate of 10.4 per cent were reported from Florida.[39]

ENDEMIC TYPHUS

Endemic typhus may be defined as a self-limited infectious, noncontagious disease caused by the Rickettsia prowazeki mooseri, which is transmitted chiefly by the rat flea. Clinically the disease is characterized by a sudden onset and an elevated remittent type of temperature, averaging two weeks in duration. A profuse rash is usually noted on the trunk and extremities, and splenomegaly is present. Termination occurs by crisis, complications are few, and the fatality rate is low.

Bacteriology. Endemic typhus is caused by the microorganism designated as R. prowazeki mooseri, which is distinguished from the Rickettsia prowazeki prowazeki, the causative organism of louse-borne epidemic typhus. Immunologically and serologically they are similar, and they produce complete cross immunity with each other. Epidemiologically they are distinctly different and are transmitted by different arthropod vectors. Constant differences are noted in experimental inoculation of animals. Zinsser[40] made some interesting observations on Brill's disease. He noted that about 95 per cent of the cases occurred in foreign-born persons and postulated that this entity may represent a recrudescence of a former attack of epidemic typhus experienced before emigration of the patient from Europe. As to the causative rickettsia, he stated:

> In our own experience with several strains of both types (epidemic and endemic) we have been able occasionally to bend the behavior of one type in the direction of the other, but as soon as experimental manipulation was relaxed the individual strains reverted to their original behavior.

The rickettsias of endemic typhus cannot be cultivated except in tissue cultures containing living cells in which they assume an intracellular, intracytoplasmic position. They stain purple with Giemsa's stain and are gram-negative. The organisms measure 0.3 micron by 1.5 microns to 2.0 microns and do not pass through the usual bacterial filters. They grow well if injected into guinea pigs, mice, or rabbits, in which they produce a characteristic tissue response. Recently Zinsser and Castaneda[41] produced an increased yield of rickettsial bodies by subjecting rats to heavy irradiation by roentgen rays before inoculation. Methods of tissue culture were first devised by Nigg and Landsteiner[42] for the rickettsia of typhus.

Zinsser, Fitzpatrick and Wei[43] developed an efficient agar tissue culture which has proved most successful in cultivating the rickettsias of endemic typhus. Pinkerton and Bessey[44] reported in 1939 that rats with a deficiency of riboflavin have a greatly increased susceptibility to typhus inoculation, and this method may be used to facilitate routine inoculation of animals.

Pathogenesis. Endemic typhus is transmitted by the bite or feces of an infected rat flea and is primarily a rat-flea-rat disease, while man and other animals are infected only incidentally. Infected fleas rarely die, an indication of ancient parasitism in these arthropods. The common vector[45,46] is the tropical rat flea Xenopsylla cheopis, which acts as the chief vector from rat to rat, rat to man and rat to other animals. The rat flea of the temperate zone, Ceratophyllus fasciatus, also acts as a vector. Pulex irritans, the human flea, can be experimentally infected, but as yet has not been found infected in nature. Fleas hatch in two or three days from eggs dropped on the ground and floors. They pass through three larval stages and enter a pupal stage. Later the adult emerges from the cocoon and survives a year or more. It is only in the adult stage that the flea takes a blood meal from man.

The tropical rate mite, Liponyssus bacoti, may transmit the disease from rat to rat or from rat to man. The rat mite drops off its host after each blood meal. Each larva requires at least four blood meals during transition from larval to adult stage.

The rat louse, Polyplax spinulosa, is a natural transmitter of endemic typhus. It lays its eggs

in opercula on the hair of an infested animal. The eggs hatch later, and a nymphal stage emerges which closely resembles the adult. The louse is transferred from host to host by casual bodily contact. The body louse, Pediculus humanus, apparently can transfer the virus of endemic typhus from man to man.[10]

The virus of endemic typhus is present in the urine of infected rats and theoretically may be transmitted to man via contaminated food. Rats can possibly acquire the disease by consuming infected ectoparasites which do not feed upon rats in nature.

The brown rat was apparently the original reservoir of the disease, but there has been a spread to other rodents. A field mouse native to Alabama was captured by Brigham[47] in 1937 and found to be infected. Other species of mice have been observed to be infected, including the cotton mouse and golden mouse. Brigham and Dyer[48] listed the following additional animals as capable of being infected with the virus of endemic typhus: guinea pig, monkey, rabbit, opossum, flying squirrel, cat, dog, gopher, wood duck and squirrel. The susceptibility to laboratory infection of rodents normally found in areas of endemic typhus suggests only the possibility that they are reservoirs in nature. The virus can be maintained indefinitely in native field mice which are prevalent in the area of Alabama in which typhus is endemic. It was transferred through 16 passage generations of the cotton mouse. In the old field mouse it was carried through 36 passage generations. The virus survived 114 days in the cotton mouse, 141 days in the old field mouse and 76 days in the golden mouse.[49]

DISTRIBUTION. Endemic typhus fever is widely distributed throughout the Southern states in the coastal areas and in the interior adjacent to and extending some distance from the coast. Many cases have been reported from both rural and urban districts in these areas. In Alabama it has been estimated that 30 per cent of the cases now are rural, while in one county of Georgia, 84 per cent occurred in the country.[21] There seems to be a general tendency for the disease to spread from the coastal areas to the interior and from urban to rural areas.

Statistics on the incidence of typhus in the Southern states from 1928 through 1938 are shown in table 1. The last six-year period of the table, as compared with the first five-year period, reveals a remarkable increase in cases reported. This probably signifies an actual as well as a statistical increase. Because of the lack of appreciation of the prevalence of the disease in the past, many cases were not recognized or reported, and statistics are far from being accurate. For example, in the state of Mississippi during the first five-year period, 1928 through 1932, no cases of endemic typhus were reported, while 505 cases were reported from Alabama, many in counties adjacent to the Mississippi state line! This discrepancy gives some idea as to the inaccuracy of statistics during that period. During the six-year period, 1933 through 1938, 51 cases were reported in Mississippi. At present the interest in the disease apparently is increasing, and statistics are showing improvement. It may be fairly stated, however, that knowledge of the incidence of the mild cases of typhus in this section is inaccurate for many of these cases are unsuspected clinically. In this area few cases of

TABLE I

INCIDENCE OF TYPHUS FEVER IN UNITED STATES

(United States Public Health Service, 1928-1938)

Southern States	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938*	1939
Maryland	5	6	38	6	23	4	15	15	1	11	10	
Virginia	13	17	46	4	22	14	5	10	6	5	5	
North Carolina	0	3	16	6	24	46	23	51	33	70	82	
South Carolina	1	5	22	13	24	54	38	57	57	101	140	
Georgia	48	57	238	127	308	625	414	485	815	1046	908	
Florida	49	58	39	28	42	54	35	27	55	121	116	153†
Kentucky	0	0	0	0	0	1	0	0	0	1	0	
Tennessee	2	2	0	1	2	1	0	8	6	22	24	
Alabama	59	72	67	80	237	823	287	294	369	480	342	
Mississippi	0	0	0	0	0	1	0	5	6	15	24	
Louisiana	0	1	0	1	17	11	18	20	12	23	27	
Arkansas	0	9	0	0	0	1	0	0	0	0	0	
Texas	5	8	13	43	227	398	496	276	327	453	497	
Oklahoma	0	0	0	0	0	0	0	0	0	1	1	

*Incomplete.

†Florida State Board of Health.

endemic typhus have been differentiated from Rocky Mountain spotted fever by laboratory methods.

The greatest seasonal prevalence is in the summer and fall, with the peak occurring in July, August and September. Cases are seen the year around in endemic areas. The sex incidence of the disease is from two to four times as high in men as in women and children. The higher incidence in men is explained by their greater exposure to rodents due, in part, to occupation. The negro race apparently is not as susceptible as the white race for it contributes only from 10 to 15 per cent of the cases. This low figure may be due, however, to difficulty in recognizing the rash in the black race.

Pathology. The pathology of endemic typhus is not well known as few necropsies have been reported in the literature. The microscopic lesion is one of an arteriolitis, presenting proliferation of the endothelium and perivascular infiltration of round cells and macrophages. Rickettsial bodies are noted in the endothelium, but the media is free of involvement. Thrombosis is not uncommon in the smaller arterioles, but necrosis is absent. These vascular changes are most commonly seen in the integument and brain. The mucous and serous membranes may be included in the vascular involvement.

In turning to diseases that are closely associated with endemic typhus for reports at autopsy, 3 cases[18] of Brill's disease presented the following: congestion of the cerebral vessels, brown atrophy and parenchymatous degeneration of the heart, a hemorrhagic spleen, congestion and edema of the lungs, degeneration and necrosis of the parenchyma of the liver, subpleural hemorrhage and a hyperplastic bone marrow. The brain in one case was described as negative, and no mention was made of changes in the blood vessels. Microscopically, arteriolitis and periarteriolitis of the smaller vessels of the medulla, the skin and the heart muscle were the principal findings. Acute splenitis, toxic nephrosis and cloudy swelling of all organs were noted and are of secondary importance.

Clinical Findings. The history in endemic typhus is usually not important, but the patient may have had an intimate association with rodents or fleas. After an incubation period of from eight to fourteen days, endemic typhus usually presents a sudden onset. A few patients, however, may become indisposed gradually. Several hours after the onset, the patient may appear toxic, with flushed face, dry skin and other signs of increased temperature response. A chill or chilliness often accompanies the onset, or occurs in the first day of the disease. The temperature usually rises to from 101 to 103 F. the first day, or may ascend to this height gradually during the first few days. The elevation of temperature remains, with daily remissions, for two weeks and terminates by crisis on from the fourteenth to the sixteenth day. In abortive cases, the temperature may remain high for several days only and return to normal by the end of the first week. Only a slight rise in temperature with a duration of less than two weeks may occur in avirulent cases. The virulence of the organism can usually be measured by the temperature response of the patient, provided that peripheral vascular collapse has not entered the picture.

Headache, owing to toxicity and lesions in the brain and meninges, may be a constant symptom most distressing to the patient and may persist for the duration of the disease. A macular rash, most often appearing on from the fourth to the sixth day,[29] is a reflection of the vascular lesions in the integument. The rash may occur as early as the second day, or as late as the eleventh day,[50] and consists of dull red maculas from 3 to 6 mm. in diameter with rather poorly defined margins that fade on pressure. Occasionally the rash assumes a maculopapular appearance, and, if endothelial damage is severe, petechial and purpuric areas develop. The rash usually persists for from five to ten days; yet cases in which there is an evanescent rash are reported along with those in which there is apparently no rash present. Cases characterized by a mild rash or no rash are usually of the avirulent or abortive type. The rash in the majority of cases begins on the chest or abdomen and on the medial aspect of the arms, and spreads centrifugally to involve most of the dermal surface of the trunk and extremities. The palms, soles and face usually are not involved. I have noted in southern Florida at least one case in which there was a profuse, persistent rash on the face. This case was proved to be endemic typhus by protection and cross immunity tests. The rash fades gradually and may coalesce; desquamation, if it occurs at all, is rare.

Muscular pain of a generalized nature suggests vascular lesions in the skeletal muscles, or it may indicate, along with profound asthenia, the great degree of toxicity presented in some cases. Epistaxis occurs and is caused apparently by vascular lesions in the nasal mucous membrane; conjunctivitis may indicate further involvment of the mucous membranes. Cough and expectoration mirror the pathologic changes in the smaller vessels of the respiratory tract. The vascular proliferative process sometimes involves the intestinal tract, and intestinal hemorrhage, owing perhaps to thrombosis, has been noted. Abdominal pain and constipation may indicate peritoneal involvement; vascular lesions in abdominal lymph nodes or viscera can produce identical symptoms.

On physical examination the main points of interest, besides the rash described, are as follows: The mental status of the patient may be distinctly altered, although usually to a mild degree. Apathy, irritability and insomnia are not uncommon and reflect the lesions of the central nervous system and the toxicity of the patient; delirium may develop, but is rare. The pulse usually presents a bradycardia. Splenomegaly is common in this disease and is a reflection of the diffuse acute splenitis present. The spleen is often palpable soon after the onset of the disease. Lymphadenopathy has been noted and represents hyperplasia of the peripheral lymph nodes.

From the preceding description of the clinical aspect of this disease, the common clinical variations perhaps need no further emphasis. Suffice it to say, the typical cases of typhus will not be incorrectly diagnosed by the clinician who is familiar with the disease, and should not be too often mistaken by the novice. The avirulent and atypical forms of the disease are, however, a diagnostic pitfall for the beginner and experienced alike, unless the diagnosis is kept constantly in mind in all cases of undiagnosed fever with or without rash.

COMPLICATIONS. Complications of endemic typhus are apparently infrequent, and very little seems to have been written about them. As thrombosis of the smaller vessels is common, phlebitis must occur more often than has been reported. In older persons with atherosclerotic peripheral vessels, thrombosis and infarction in the heart, brain, kidney, lungs, or spleen might easily occur. In patients with preexistent myocardial or valvular damage, congestive heart failure may develop and result in a fatal outcome. The prolonged high temperature and great toxicity with increased metabolism predispose to peripheral vascular collapse, commonly seen in other febrile states of long standing. Bronchopneumonia occurs terminally most often in the oldest age group. Thromboangiitis obliterans is considered by some[51] to be a late sequela of typhus. The fatality rate averages approximately 5 per cent, being less than 2 per cent in the group under 45 years, from 5 to 7 per cent for ages 45 to 64, and approximately 30 per cent for the age group over 65 years.[51]

LABORATORY. The diagnosis of endemic typhus fever may be assumed on clinical grounds alone, or it may be made on clinical grounds plus a positive Weil-Felix reaction. This agglutination test, which results in a positive reaction in a number of the rickettsial diseases, does not differentiate endemic typhus from Rocky Mountain spotted fever. To make this differentiation, animal inoculation or cross immunity tests must be performed not later than the fifth day of the disease. Protection tests may be performed later during the progress of the disease or in the period of convalescence. Although differentiation can be made often on clinical grounds alone, laboratory confirmation should be obtained in the areas where the diseases coexist. The white blood cell count varies from 3,500 to 15,000, and often reveals a slight to moderate shift to the immature forms. In the cases I have observed, a leukocytosis has rarely been seen. Examination of the spinal fluid usually gives negative results, but slight increases in globulin and a shift in the midzone of the colloidal gold curve occur.

The Weil-Felix test is performed by mixing blood serum from the patient with a suspension of the strain OX_{19} of the Proteus bacillus in serial dilutions. An agglutination of the organism in a titer of 1:640 or higher is considered a positive test. It has been noted that positive agglutinations up to 1:320 result from other diseases besides typhus. The agglutinins usually appear sometime during the second week, rise to their peak at the time of defervescence and diminish rapidly thereafter. Some cases fail to develop positive agglutinins in the course of the disease. A rising titer in dilutions up to 1:320 may be considered suggestive of typhus, especially if the first test showed an absence of agglutinins. Castaneda[52] suggested that Proteus and

Rickettsia have a common antigenic factor which is probably a polysaccharide, thereby offering an explanation for the positive agglutination of the Proteus organism in the Rickettsial diseases.

The test by animal inoculation consists of injecting 5 cc. of the patient's blood into the peritoneal cavity of male guinea pigs, or a smaller amount into rats. In a positive test the guinea pig will exhibit a febrile response in from four to twenty days. The typical reaction in endemic typhus is swelling, edema and erythema of the scrotal sac. Transfer may be made on the third or fourth day of the rise in temperature by the injection of blood or macerated brain, spleen, or tunica vaginalis into fresh animals. Rickettsial bodies may be observed in scrotal smears, and inflammatory lesions containing rickettsias are seen in the mesothelial cells of the tunica vaginalis after appropriate staining. Lesions similar to those produced by the virus of Rocky Mountain spotted fever are found in the brain of infected animals. Lillie, Dyer and Topping[53] pointed out differences in the anatomic location of the lesions in the two diseases. Animal passage in guinea pigs and rats may be continued indefinitely.

Rats present a febrile response after inoculation, and rickettsial bodies are noted in the scrotal sac. Rats subjected to antecedent radiation with roentgen rays will produce large numbers of rickettsial bodies intraperitoneally after injection with infectious material. Rats with a deficiency of riboflavin have a greatly increased susceptibility to typhus.[44] These rats may be preferable for use in routine animal experimentation. In rabbits and monkeys positive Weil-Felix reactions develop after inoculation, but in guinea pigs they do not.

Cross immunity tests are of value in the final differentiation of the disease. Guinea pigs are injected with infectious material and after a suitable period are inoculated with known strains of rickettsial diseases. They show protection against the virus of the organism which was originally injected, but no protection against other rickettsias.

Protection tests are performed by mixing blood serum from the patient and known infectious material from typhus fever and Rocky Mountain spotted fever separately. After a suitable interval the mixture of serum and rickettsias is injected into guinea pigs. Controls are injected with infectious material from both diseases. The animals injected with the serum containing antibodies of the rickettsia injected, are completely protected. The controls and those animals injected with the rickettsias that do not have antibodies in the serum manifest a febrile reaction or succumb. The protection test is of little value in typhus unless definite differences are noted in the clinical course of the disease in the protected animals and in the other groups.

Differential Diagnosis. Endemic typhus must be differentiated from Rocky Mountain spotted fever. This distinction is possible clinically in the classical cases, but difficult in the atypical cases. The rash of typhus, typically beginning on the trunk and spreading centrifugally to the extremities, is in contrast to the rash of Rocky Mountain spotted fever that most often begins on the wrists and ankles and spreads to the trunk in a centripetal fashion. It usually does not involve the palms, soles, scalp, and face, as it does commonly in Rocky Mountain spotted fever. The individual lesions of the skin are not greatly different, both being macular and maculopapular. The rash of Rocky Mountain spotted fever becomes petechial as a rule, but the petechial aspect occurs occasionally in typhus. A sudden onset is characteristic of both entities, while headache, epistaxis and conjunctivitis may be noted in either. The temperature curves are not greatly different, but the temperature of typhus falls by crisis on from the fourteenth to the sixteenth day, while the temperature in Rocky Mountain spotted fever terminates by lysis from the fifteenth to twenty-second day. Splenomegaly and bradycardia are observed in both conditions. The white blood cell count ranges from 3,500 to 15,000 in typhus and from 15,000 to 30,000 in Rocky Mountain spotted fever. The Weil-Felix reaction is positive in both diseases.

The preceding scheme for differential diagnosis cannot be applied to the mild or abortive cases that often are of short duration and present an atypical rash or none at all. These cases can only be differentiated by animal inoculation, cross immunity tests and protection tests.

Endemic typhus must be differentiated from typhoid fever. The rapid onset, profuse rash and sudden termination of the fever in two weeks by crisis distinguish typhus clinically from typhoid with its insidious onset, scanty crop of rose spots and fever of from two to five weeks'

duration with termination by lysis. In the laboratory typhus presents a positive Weil-Felix response as compared to typhoid fever in which studies may reveal cultures of the blood, stool and urine that are positive for the typhoid bacillus or there may be a positive Widal reaction.

Dengue and endemic typhus could be confused. Nevertheless, the duration of dengue is about one week, and the remission of symptoms for one or two days before the secondary rise in temperature distinguishes it from typhus. In dengue painful extremities are a major complaint. The rash in dengue usually occurs on the fifth or sixth day, is morbilliform, and usually begins on the hands and spreads to the back, chest, upper arms and thighs. A leukopenia is the rule of dengue. The Weil-Felix reaction is negative. Dengue rarely occurs sporadically and is almost always epidemic.

Meningococcic meningitis may present a rash similar to that of typhus. The stiff neck, the altered reflexes indicating involvement of the upper motor neurons, and palsy of cranial nerves suggest cerebral and meningeal involvement. A negative Weil-Felix reaction and a culture of the blood or spinal fluid or a smear that is positive for the meningococcus, with a pleocytosis in the spinal fluid and an elevated intrathecal pressure, differentiate meningococcic meningitis from typhus.

Secondary syphilis might be confused with endemic typhus. The lack of intense febrile reaction, the presence of a chancre and of condylomas or lesions of the mucous membrane, the occurrence of the typical ham-colored lesions on the face, palms and soles, along with positive dark field evidence or serologic change, and a negative Weil-Felix reaction should, however, make the differentiation between secondary syphilis and typhus not difficult.

PREVENTION AND TREATMENT. Prevention of endemic typhus could, theoretically, be effected by the eradication of rodents. This has been found to be generally impracticable in most localities. The virus of endemic typhus was not available in sufficient number for experimentation with vaccine until Zinsser and Castaneda[41] in 1932 produced large numbers of rickettsial bodies in the peritoneal cavity of rats by subjecting them to roentgen therapy before inoculation. Since then, successful vaccination of human volunteers[54] in experimental typhus has been carried out, and laboratory workers have been protected. In 1939, a method of agar tissue culture was devised[43] which produces a copious growth of rickettsial bodies that can be transplanted. Successful animal protection has been effected with vaccines derived by this method, but extensive field application has not been made. It seems that in the near future commercial vaccine may be obtained and used in sections where it appears justifiable.

Passive immunity in endemic typhus has been achieved[55] by the injection of large doses of virus in horses. The horse serum has given promising results clinically in a small number of cases. Guinea pigs with experimental typhus showed no improvement after treatment with sulfanilamide.[56]

ROCKY MOUNTAIN SPOTTED FEVER

Rocky Mountain spotted fever may be defined as a self-limited, noncontagious infectious disease caused by the rickettsia Dermacentroxenus rickettsi, which, in the South, is transmitted chiefly by the wood tick. It is characterized by a sudden onset and a moderate to high remittent fever of two or three weeks' duration. A profuse petechial rash, beginning at the periphery of the extremities, eventually involves the trunk, face and remainder of the limbs. The disease terminates by crisis or lysis; complications are frequent, and fatalities are not uncommon.

BACTERIOLOGY. The rickettsia, Dermacentroxenus rickettsi, was divided into two general types according to geographic distribution. The organism occurring in the Mountain states was known as the Western type while that occurring in the Eastern and Southeastern part of the United States was known as the Eastern type. Originally this arbitrary division conveyed a difference in severity in the two types of the disease as the Western type was thought to be more virulent, with a higher mortality in both man and experimental animals, than the Eastern type. At present, it is known that this division into types has little significance for strains of widely varying virulence may be found in both the Eastern[57,58,59] and the Western sections of the country.

The organism presents practically identical morphologic and staining characteristics with those of Rickettsia prowazeki of typhus fever. Methods of animal inoculation produce a rather characteristic response in the guinea pig, rabbit

and monkey. The rickettsia, Dermacentroxenus rickettsi, can be cultivated only in the presence of living cells, in which it assumes an intranuclear position in contrast to the R. prowazeki, which occurs intracytoplasmically. Methods of tissue culture similar to those described for the R. prowazeki of endemic typhus may be used for the cultivation of this rickettsia. Cox[60] recently developed an efficient technic for the cultivation of the rickettsia, Dermacentroxenus rickettsi, on egg yolk. Animal inoculation is commonly used for perpetuation of the micro-organism, as in endemic typhus.

Pathogenesis. In the South the rickettsia of Rocky Mountain fever is transmitted to man and animals by the common dog tick, D. variabilis.[61] This tick, in its development, passes through three stages. The larval stage[46] develops from the egg and attaches to a host, usually a rodent. The mouse often acts as the host. A blood meal is taken, and the larva drops to the ground and develops into the adult stage. The adult tick then climbs upon foliage and waits for a potential host to which it may attach. Dogs, cattle, deer, smaller wild animals and man are commonly chosen as hosts, and a blood meal is partaken of by the adult tick. Thus the dog tick not only becomes infected in any of its three stages by taking a blood meal from an infected animal, but it also acquires the microorganism of the disease by hereditary passage via the egg from the female adult and from infected spermatozoa of the male adult tick. The life cycle of the dog tick is approximately one year. Data concerning the seasonal appearance of the immature forms of the dog tick are incomplete, but the nymphs apparently engorge over a period of several months. The adult, however, appears late in the spring and remains active until late in the fall. The virulence of the virus is practically nil in hibernating ticks, but if the blood meal is taken, the virus is reactivated and the virulence is increased to a pathogenic degree in a period varying from eight hours to three days. The length of the period of reactivation is shorter in warm weather than in cold. The tick carrier rate and density of human population are two important factors in determining the prevalence of infection. The tick carrier rate may be as high as 5 per cent in endemic areas, while the higher density of population in the South and East, as compared with the West, contributes to an increase in the prevalence of the disease in these sections.

The rabbit tick, Haemaphysalis leporis palustris, transmits an attenuated form of Dermacentroxenus rickettsi in nature from rodent to rodent and apparently does not bite man. It is widely distributed over the South as well as the entire country. There is a broad seasonal occurrence of the rabbit tick; it completes a life cycle in one year. The larval, nymphal and adult stages are limited to rabbits and certain ground-frequenting game birds. Thus the virus may possibly be disseminated over wide areas by infected fowls.

In addition, there are several species of ticks in the South that have to be considered[62] as potential carriers: Rhipicephalus sanguineus, the brown dog tick, is widely distributed throughout this section; A. americanum is found in certain sections of the South; Amblyomma cajennense is found in southern Florida. In the West, D. andersoni, the Rocky Mountain wood tick, is the chief transmitter of the disease.

The incidence of Rocky Mountain spotted fever in the Southern states during the period of 1928-1938 is shown in table 2. The seasonal occurrence begins in April, rises to a peak in June, July and August, and declines until November when a base line is reached. Occasional

TABLE II

INCIDENCE OF ROCKY MOUNTAIN SPOTTED FEVER IN UNITED STATES

(United States Public Health Service, 1928-1938)

Southern States	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937*	1938*
Maryland	....	....	....	38	49	55	33	33	32	33	42
Virginia	....	....	....	22	29	23	47	44	50	54	68
North Carolina	....	....	....	8	7	27	34	21	32	27	42
South Carolina	....	....	....	5	6	....	....	2	....	1	3
Georgia	....	....	....	....	....	3	1	....	1	....	....
Florida	....	....	....	....	....	....	2	....	....	....	....
Kentucky	....	....	....	....	....	....	2	....	3	1	....
Tennessee	....	....	1	4	1	2	3	1	4	9	8
Alabama	....	....	....	....	....	....	1	3	1	....	2
Mississippi	....	....	....	....	....	....	....	....	....	....	
Louisiana	....	....	....	....	....	....	....	....	....	....	

*Incomplete.

cases may be seen during the winter season in the far South. In the past, men were more often infected than women or children because of their greater frequency of exposure to the ticks due to occupation and activity in sports. With the growing participation of women and children in camping, hunting and fishing, an increasing number of cases occurs in these groups. At present, the sex incidence is equal. Recently, the largest number of cases was reported in the five to nine year age group.

PATHOLOGY. The pathology[63] of Rocky Mountain spotted fever, for the most part, involves the smaller blood vessels of the integument and the central nervous system. The microscopic lesion is one of a panangiitis, presenting proliferation of the endothelial, medial and adventitial layers of the arterioles, and perivascular infiltration. Rickettsial bodies are found in the endothelial and medial layers. Thrombosis of the smaller vessels occurs commonly, while necrosis, hemorrhage and sloughing have been known to occur. The mucous membrane of the soft palate may be involved in a necrotic process. The brain often contains focal areas of endothelial proliferation, thrombosis and perivascular infiltration. Neurogliar proliferation may overshadow the vascular origin of these lesions. The cerebral cortex, pons, cerebellum, basal ganglia and medulla are the most frequent sites of focal involvement. Congestion of the meninges is commonly seen at autopsy. These changes in the brain are characteristic of cases of Rocky Mountain spotted fever in the South and East, but as yet have not been demonstrated in cases occurring in the West.

Thrombosis of the small arterioles of the heart, liver, pancreas, spleen, kidney, bladder, lymph nodes and gastrointestinal tract are fairly frequent findings, while acute necrosis and cloudy swelling of the myocardium, liver and pancreas are less often observed. Acute splenitis, toxic nephrosis, and petechial lesions in serous and mucous membranes are rather frequent findings. Hemorrhage into the left rectus muscle has been reported.[64] Bronchopneumonia is a usual finding at autopsy in the cases of the South, while peribronchial hemorrhage and small pulmonary infarcts occur less frequently. Thrombosis of the larger veins is not an uncommon sequel.

CLINICAL FINDINGS. Rocky Mountain spotted fever has an incubation period averaging from two to five days, but in the milder cases varying from three to fourteen days.[65] There may be a prodromal period of two or three days characterized by symptoms of mild toxicity, such as anorexia, malaise, irritability and chilliness. The onset[66] is usually sudden and is accompanied by a chill, rapidly ascending temperature, severe headache, great malaise and generalized muscular aching, often most pronounced in the lumbar region. These symptoms are indicative of the considerable degree of toxicity that is present in a majority of the cases soon after the onset. The temperature varies from 100 to 105 F., is of the daily morning remittent type and persists in the average case from fourteen to twenty-one days, or longer. On the fifth or sixth day, or as early as the third or as late as the seventh day, a macular rose-colored rash makes its appearance on the wrists and ankles, less often on the forehead, and, in the majority of cases, spreads toward the trunk in a centripetal fashion. Soon the rash involves the face, scalp, back, chest and abdomen, as well as the extremities, including the palms and soles, and presents a mottled, dusky appearance. The individual maculas measure from 2 to 6 mm. in diameter, fade in the morning when the temperature is down and reappear in the afternoon with the rise in temperature. The lesions of the skin are contingent upon the widespread vascular lesions. About the end of the second week the lesions in the integument become definitely petechial in all but the mildest cases; this condition may be caused in some instances by thrombocytopenia[58] as well as vascular participation. Widespread vascular lesions in the central nervous system and the great toxicity characteristic of the infection explain the symptoms of headache, irritability, aphasia, deafness and muscular incoordination that are often present in these cases. Nausea, vomiting and intestinal hemorrhage are indicative of involvement of the vascular system of the gastrointestinal tract; acute ileus has been reported.

Besides the rash described, edema of the face and extremities is sometimes present, reflecting the widespread arteriolar and capillary damage in the skin and other areas resulting in a loss of plasma into interstitial fluid. Occasionally the edema may become generalized. In the more severe cases the rash may

become purpuric or hemorrhagic. Necrosis of the scrotum, prepuce, fingers, toes, ears and areas of the skin over bony prominences occurs in the extreme cases. There may be muscular rigidity, tremor, or opisthotonos,[65] and examination of the reflexes may reveal signs of involvement of the upper motor neurons, which are, namely, rigidity of the neck, a positive Kernig sign, a positive Babinski sign, hyperactive deep reflexes and absence of superficial reflexes. Hyperesthetic areas of the skin and pain on palpation over peripheral nerves may predicate involvement of these nerves or a spinal segment. Insomnia and restlessness may be outstanding, and delirium or stupor are commonly present in the more toxic cases. Convulsions sometimes occur, and true coma often presages a lethal ending.

The mucous membranes of the oral cavity and the pharynx sometimes present an enanthema, and evidence of epistaxis may be noted in the nares. Conjunctivitis is almost invariably present. A generalized lymphadenopathy is commonly noted. The spleen is often palpable on the third day or later. The pulse usually presents a tachycardia consistent with the rise in temperature, but in fatal cases the pulse becomes rapid and weak, an indication of peripheral vascular collapse. Jaundice and a palpable liver may be present on the basis of an acute hepatitis, suggesting hepatic insufficiency. Examination of the lungs may reveal a few scattered rales, pointing toward a bronchitis, and the additional findings of dyspnea and cyanosis may be indicative of a bronchopneumonia. In most cases the temperature begins falling by lysis early in the third week and usually reaches normal by the middle or end of that week. During convalescence a branny desquamation of the skin is a usual manifestation, and scar tissue may develop in the skin if ulceration has occurred.

Rocky Mountain spotted fever presents considerable variation in its severity. Mild ambulatory and abortive forms are observed which may or may not exhibit a rash. In mild cases the rash and fever may terminate within two weeks, while in the abortive cases recovery may be effected in less than a week. In fulminating cases presenting an overwhelming toxicity death may supervene in three or four days, and a rash may not occur. Large ecchymotic areas may, however, appear in the integument. In these cases, there is involvement of the central nervous system to a decided degree. The rash in Rocky Mountain spotted fever may occasionally begin on the trunk and proximal portions[66] of the extremeties, leaving the distal aspect uninvolved. A case resembling erythema nodosum was reported recently.[67]

Complications. Complications of Rocky Mountain spotted fever are not rare. Bronchopneumonia has been mentioned and occurs frequently in the more severe cases. The pneumonic process in the lung sometimes becomes confluent and presents a massive lobar involvement. Abscess[68] of the lung has been reported. Phlebitis is fairly frequent, and hemiplegia resulting from cerebral thrombosis has been reported, mostly in the upper age group. Acute nephritis is said to occur. Conjunctivitis is common, and iritis occurs rarely. Hiccough may be a distressing complaint. Deafness is a fairly frequent sequel. Concurrent infections of streptococcic septicemia and tularemia occur. In two cases of concurrent tularemia reported by Parker, Philip and Jellison,[61] the patient did not survive.

Laboratory Data. As in endemic typhus fever, the diagnosis of Rocky Mountain spotted fever may be made on clinical grounds alone or with the addition of a positive Weil-Felix reaction. In the South, however, where the two diseases coexist, it is best to make the diagnosis with the aid of tests by animal inoculation. The white blood cell count varies from 12,000 to 30,000, in contrast to the leukopenic or normal blood count most frequently seen in endemic typhus. A moderate to decided shift toward immaturity is the usual change in the differential count. Examination of the spinal fluid gives negative results. The Weil-Felix test is performed in the manner described for typhus fever. Proteus strains OX_{19} and OX_2 both should be used, as the ability to agglutinate either strain varies with different serums. A positive agglutination of 1:320 with one or both strains is diagnostic, and a 1:160 agglutination is suggestive. Parker and his associates[61] suggested taking samples of blood early in the disease, one on the fifteenth day and another on the twenty-second day. If examination of the first sample gives negative results, a rising agglutination titer up to 1:160 is highly suggestive of Rocky Mountain spotted fever. Inoculation of guinea pigs should be made early in the disease with 5 cc. of the patient's blood injected intraperitoneally, as described under ende-

mic typhus. Usually a pronounced febrile reaction or death of the animal results, although there is a wide variation in febrile response and fatality rates with different strains. Characteristically, in the male guinea pig a scrotal reaction is produced, which begins on the third or fourth day of temperature response. A macular scrotal rash, which may coalesce, and edema are noted, while necrosis of the lesions with formation of scar tissue later completes the picture.

It has been suggested that endemic typhus and Rocky Mountain spotted fever may be differentiated by inoculation of rabbits with blood from suspected cases. Rocky Mountain spotted fever produces agglutinins in rabbits for both the OX_{19} and OX_2 strains, while typhus produces agglutinins for the OX_{19} strain only.

Protection and cross immunity tests are both of value in diagnosis and are carried out in the fashion described under endemic typhus fever. The protection test has a wider application in Rocky Mountain spotted fever than in endemic typhus.

DIFFERENTIAL DIAGNOSIS. The differentiation of Rocky Mountain spotted fever and endemic typhus has been discussed under endemic typhus fever.

Typhoid fever should not present much difficulty in differential diagnosis. The sudden onset, profuse rash, leukocytosis and positive Weil-Felix reaction in Rocky Mountain spotted fever are in contrast to the insidious onset, scanty crops of maculas, positive blood and fecal cultures, positive Widal reaction and leukopenia of typhoid. In atypical cases of either disease the diagnosis may have to be based on laboratory findings alone.

Meningococcic meningitis can be differentiated from Rocky Mountain spotted fever by the discrete character of the macular rash, palsy of the cranial nerves, signs of great meningeal irritation and involvement of the upper motor neurons, a negative Weil-Felix reaction and, finally, by cultures of the blood and spinal fluid and smears that are positive for the meningococcus. In meningococcic meningitis a pleocytosis with decreased glucose and chloride fractions is observed in the spinal fluid in addition to increased intraspinal pressure.

Measles with a complicating encephalitis may simulate Rocky Mountain spotted fever during the first few days of the disease. The confluent morbilliform rash beginning around the hair line of the head and extending downward over the face, trunk and extremities, terminates on the third or fourth day. The typical facies, Koplik spots, leukopenia and negative Weil-Felix reaction suggest measles. If encephalitis is present, the spinal fluid may exhibit slightly increased pressure, scanty pleocytosis, a small amount of globulin and a normal or increased glucose fraction in contrast to the negative findings pertaining to the spinal fluid in Rocky Mountain spotted fever.

Dengue fever is confused only with atypical, abortive cases of Rocky Mountain spotted fever. The epidemic occurrence, short duration of approximately one week with a lag period in the temperature curve, morbilliform rash that fades quickly, leukopenia and negative Weil-Felix reaction serve to distinguish dengue from Rocky Mountain spotted fever.

Secondary syphilis might be confused at first glance. The history of chancre, finding of mucous patches or condylomas, and positive dark field or serologic evidence should make the differentiation easy here. The temperature rarely ascends greatly in syphilis, and the rash is usually of a discrete, ham-colored, nonpetechial type.

Dermatitis owing to drugs might simulate Rocky Mountain spotted fever early in its course, but the history of ingestion of a drug and the eventual clearing of the rash on its discontinuance usually result in differentiation of the two conditions.

PREVENTION AND TREATMENT. Prevention of Rocky Mountain spotted fever consists in keeping away from the tick-infested rural sections. If one is going to be exposed in the woods, high tight-fitting boots worn with riding breeches should serve as an effective blockade against ticks. Nevertheless, the body of the exposed person should be examined twice daily, especially in the posterior cervical region, a favorite site for ticks. Iodine or a silver nitrate stick should be applied to bites of the tick.

Vaccination with a vaccine prepared by Parker[61] from infected ticks in a sterile fashion has been used successfully in the West for a number of years. The vaccine is administered twice in 2 cc. doses five days apart. Protection against the milder strains and partial protection against the virulent strains are accomplished. Vaccination must be repeated yearly. A vaccine has

been prepared from the rickettsia grown on embryonic chick tissues[69] and by agar tissue culture,[70] methods that have successfully protected guinea pigs against virulent doses of this rickettsia. An immune rabbit serum[71] has been made that prevented the death of a large percentage of infected laboratory animals. Sulfanilamide[58] and sulfapyridine did not benefit guinea pigs infected with the rickettsia of Rocky Mountain spotted fever, and in two reports on patients[72] no change was seen in the clinical status after sulfanilamide therapy.

AMERICAN Q FEVER

The name, American Q fever was suggested by Dyer[73] for a little known clinical entity in the United States similar immunologically to Australian Q fever. This rickettsial disease of Australia occurs in farmers and workers in slaughterhouses, and was first described by Derrick[74] in 1937. The insect vectors and animal reservoirs have not been identified in that country.

The causative organism of American Q fever is a filtrable virus first isolated from ticks in Montana in 1935 by Davis and Cox.[75] The virus could be cultivated on tissue cultures,[76] and rickettsia-like organisms were produced intracellularly in the cultures. Cox[77] suggested the name Rickettsia diaporica for this micro-organism. The rickettsia was demonstrated by Parker and Davis[78] to be transmitted by the egg, nymphal and adult stages of D. andersoni. Davis[79] demonstrated that R. diaporica could survive the tissues of the tick, Ornithodoros turicata, for at least one thousand and one days. It was not transmitted via the egg to the next generation, but the excrement of the tick was infectious.

Bengtson[80] recently showed the similarity of the rickettsias of Australian and American Q fevers by agglutination and agglutination-absorption tests. Further evidence of this similarity was presented in tests similar to the precipitin test, in which immune and convalescent serums with filtrates and ultrafiltrates were used.

Until last year the disease had been reported from the state of Montana only. In a recent article Cox[81] stated that 11 of 27 persons employed in the Rocky Mountain Laboratory at Hamilton, Mont., had positive agglutination tests for American Q fever. In the same article he reported 72 blood samples tested in this laboratory by innoculation of guinea pigs or agglutination tests. Nineteen furnished suggested evidence of infection. All patients except one lived in the range of D. andersoni in the states of Idaho, Montana, Wyoming, Nebraska, Nevada, Oregon and Washington. A rather wide geographic distribution of the disease, at least in the Northwest, is thus suggested.

An institutional outbreak[82,83] of this disease occurred in the National Institute of Health Washington, D. C., in 1940. Fifteen cases occurred, and the rickettsia of American Q fever was isolated in three of four attempts. No known arthropod vector was discovered, and no history of close personal contact between the cases was elicited.

Recently two cases[84] were reported from Montana, one in detail, in which there was no history of the bite of a tick. From the rather meager evidence accumulated at present it is difficult to be definite regarding the mode of transmission of this disease. Ticks apparently can act as vectors, and possibly other unknown vectors exist.

The pathologic changes characteristic of the disease are little known. In one human case,[85] at autopsy the lungs presented a patchy bronchopneumonia. Microscopically there was noted a copious, fibrinous, granular exudate containing many large round mononuclear cells filling the alveolar spaces along with a few erythrocytes and fibroblasts. In one photomicrograph of material from the lung a moderate number of polymorphonuclear leukocytes were observed. Generally the alveolar walls were thickened and contained many mononuclear round cells. Grossly the spleen was large, soft and flabby, and histologically it presented a follicular hyperplasia and congested pulp containing scattered neutrophils and moderate numbers of lymphoid and plasma cells. The splenic sinuses were dilated. Rickettsias were not observed in any sections of the tissue. At autopsy similar alterations of tissue were observed in 8 innoculated monkeys. Lillie, Perrin and Armstrong[85] directed attention to the similarity of the pathologic findings in this case and in cases of bronchopneumonia of undetermined etiology reported by Kneeland and Smetana [86] and Longcope.[87]

Clinically[82] the onset of the disease is fairly sudden. Headache and general malaise may be the first symptoms, and chilliness is often noted. If the temperature ascends to a high level, chills

and sweating may be observed along with generalized aching. Nausea and vomiting have occurred, and a short nonproductive cough is common. Occasionally the cough becomes productive, and a white, thick, tenacious, scanty sputum is expectorated. Vague pains in the chest and insomnia may be among the complaints.

Physical examination in these cases is characterized by a lack of physical signs. Occasional rales in the lungs have been reported. No dyspnea has been noted. Elevation of temperature may vary from 100 to 104 F. and may persist for from five to fifteen or more days.

Roentgen examination presents the most consistent evidence of pulmonary involvement. A soft infiltrative type of lesion in the parenchyma, patchy in distribution and single or multiple in number, was noted in the roentgenograms described by Hornibrook and Nelson.[82] Usually one lobe was involved, but occasionally multilobar distribution was observed.

The white blood count ranged from within normal limits up to 21,950. Invariably the polymorphonuclear leukocytes were increased, the differential count varying from 70 to 82 per cent. Agglutination tests for typhoid fever, paratyphoid fever A and B, tularemia and undulant fever, and the Weil-Felix reaction all give negative results in American Q fever.

Diagnosis is suggested by the clinical picture, that is, chiefly cough and persistent fever, and the scarcity of physical signs along with the pathologic changes seen in roentgenograms of the chest. Laboratory tests must be undertaken to establish the diagnosis.

American Q fever can be differentiated in the laboratory by animal inoculation, cross immunity and protection tests, and agglutination reactions. The injected guinea pig, after an incubation period of from two to eighteen days, presents a febrile reaction of from two to eight days in duration. The guinea pig is injected with the venous blood of the patient, and nonspecific inflammatory thickening of the skin occurs at the site of injection. Death of the animal is common, and an enlarged spleen is the chief finding at autopsy. White rabbits and mice are susceptible to inoculation.

Cross immunity and protection tests show similar immunologic properties of the rickettsias of American and of Australian Q fever. There is no cross immunity or protection exhibited between the rickettsia of American Q fever and that of Rocky Mountain spotted fever or endemic typhus fever. Agglutination of R. diaporica with the patient's serum in titers of 1:80 to 1:160 is probably diagnostic of the disease, but at the present time little has appeared in the literature regarding the agglutination test.

At present nothing is known pertaining to the treatment of the disease in man. In guinea pigs, however, Bengtson[88] produced successful active immunity with vaccines prepared from the liver and spleen of inoculated guinea pigs and mice. Adequate passive immunity was produced by the injection of immune and hyperimmune serums of guinea pigs and rabbits.

Although relatively few data have been accumulated pertaining to American Q fever and though animal reservoirs are unknown, it has been established that the tick is infected in nature. One may assume, therefore, the possibility of cases being discovered in the future from tick-infested areas in the South and other parts of the United States.

SUMMARY

A review of endemic typhus fever and Rocky Mountain spotted fever in the South is presented. Historical and bacteriologic data, pathogenesis, pathologic changes, clinical findings, complications, laboratory data, differential diagnosis, prevention and treatment are discussed. American Q fever is likewise considered in brief.

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THE PUBLIC HEALTH CONTROL OF GONORRHEA

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After six years of fairly constant effort to publicize throughout the breadth of the land the problems of venereal disease existing in the country and to awaken both a lay and professional conscience to the necessity of taking immediate action, the unalterable fact remains that although some progress has been made towards the eventual control of syphilis, apparently little headway has been made towards the control of gonorrhea. It may be that this poor showing is partly the fault of the officials of public health organizations. In bringing before the public facts on venereal diseases, we have made syphilis the star of the story, featuring all of its characteristics, and in our enthusiasm to expose this scourge, we have relegated gonorrhea to the background, allowing it to continue its sinister course with impunity. It is appropriate at this time to give this other scourge some deserved attention and to consider, in view of the recent introduction of new chemotherapeutic allies, a practical application of the public health control of gonorrhea. This consideration is all the more urgent now because our present national military preparations are creating, and will continue to create acute problems relating to venereal disease, which will require immediate and effective counteraction.

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Read before the Florida Health Officers' Meeting, Jacksonville, April 28, 1941.

N. A. Nelson, Director of the Division of Genitoinfectious Diseases, Massachusetts Department of Health, recently said:

> What we may now do for the control of the genitoinfections is limited only by our knowledge of them, the rapidity with which we can teach people what we know, the funds which we can acquire for control purposes, and the sincerity and energy with which we pursue the objective. To a very considerable degree, the first of these limitations pivot upon the last. We can influence the rate at which research produces more knowledge, at which the public is enlightened, and at which working funds are obtained by the sincerity and energy with which we pursue the objective. It is the will to do the job that counts.

To the end that we who are officially responsible may face this problem boldly, let us analyze both the negative and the positive attitude held by public health officials, as well as by private practitioners. It has been expressed many times that we cannot hope to control gonorrhea on the same scale as syphilis because we lack reliable medical diagnostic and therapeutic procedures. The argument is often proposed that since the disease is so widespread and intimately related to the sexual habits of the individual, it is practically impossible to make any headway until more accurate scientific methods are devised. It has been admitted by many that previous to the introduction of the sulfonamides, public health control and, for that matter, the individual care of patients with gonorrhea presented such tremendous problems that it was considered a waste of energy to attempt a program of public health control. This attitude so permeated public health thinking that even now with a wider horizon opened up by the enlistment of the newer chemotherapeutic allies, many continue to be defeatists.

With the introduction of sulfanilamide and its application in the treatment of gonorrhea, a high degree of optimism infected many persons. The first reports glowingly declared that sulfanilamide was the wonder drug of the age. Gonorrhea would be conquered. A specific for its cure had been found. It was not long, however, before failures of cures and relapses appeared, and enthusiasm was somewhat dampened. Nevertheless, sulfanilamide produced in medical thought a more positive and healthier attitude towards gonorrhea, which may well lead to its complete subjugation. Lately another member of the sulfonamides, sulfathiazole, is proving superior in its therapeutic power and although we are more cautious in our elation, it may well be the drug that will do the trick.

The fact remains that we are not accomplishing control of venereal disease, but of syphilis. Although the prevalence of syphilis is great, the prevalence of gonorrhea is greater. Our reports on gonorrhea are a farce. While we can demonstrate statistical reports on syphilis in glowing terms, we sheepishly avoid discussion of statistical studies on gonorrhea. Nevertheless, we are committed to the public health control of venereal diseases and, therefore, should include all the venereal diseases in our objective.

We are all aware of the fact that gonorrheal infections are more numerous than those of syphilis. It would be foolhardy in the face of poor reporting to approximate the actual number of cases existing. But we do know that the problem of gonorrhea is as pressing, if not more pressing, than that of syphilis. In reports received from military areas, where all persons infected are reported, infections owing to gonorrhea outnumber those of syphilis at a ratio of seven to one. These figures demonstrate that in order to gear our program to the exigencies of national defense, we must well include an effective program of gonorrhea control.

In the Section on the Public Control of Gonorrhea, which met during the Conference of Venereal Disease Control in 1937, the need to include as adequate a program of control for gonorrhea as for syphilis was emphasized. It was recognized that like problems need to be solved with the same resources and personnel. As a matter of fact, the epidemiologic aspect of gonorrhea is much simpler than that of syphilis. On account of the shorter period of incubation and the appearance of more obvious clinical manifestations, especially in men, there is a better opportunity to locate and diagnose fresh contacts before they are able to spread the infection further.

To a certain extent there was some justification in ignoring gonorrhea in a public health program, when there was nothing to offer the patient but local medication. This type of treatment requires expert knowledge, experience and undue gentleness if it is to be properly applied, not to mention requirements of space and cumbersome equipment. Excepting those health departments located in large urban communities where specialists in this field are available, it was too much to expect health departments, especially in rural sections, to devote their time to looking up contacts of infected persons and then have nothing to offer them but advice. No program based on advice only could be popular or suc-

cessful. Lately, however, this picture has changed to some extent. New drugs are proving efficacious in most instances. As they can be adapted to public health procedures, we are now prepared to handle the situation in a more effective way. We need, therefore, to view the problem from a different angle and not allow our previous pessimistic attitude to lead us to ignore the new avenues of approach. It is my firm conviction that with certain limitations all health departments, whether urban or rural, can carry on a successful program of gonorrhea control. All that is required is a mental readjustment of the health officer's attitude toward the problem. He needs to share some of the enthusiasm he shows for the control of syphilis. He must continually be alert to adapt progressive public health measures to the needs. As one health officer put it, health department clinics should serve as a means of reflex education, eventually reflecting into the community at large, creating a high standard of medical care. We are familiar with the popularity of the program for the control of syphilis in the communities. This same popularity can be created for a program of gonorrhea control to the end that infected persons voluntarily gravitate to the health department for advice or aid.

It is expected that to inaugurate a program of gonorrhea control where none has been in existence before, new problems of clinic management will be created, and in some instances discouraging results of treatment with sulfonamides will be revealed. This difficulty arises from the fact that many chronic, indigent patients with gonorrhea will flock to the clinic for relief. In these cases the patients need more than internal medication. They require a specialized form of treatment which many clinics will not be in a position to offer. This situation, in itself, will demonstrate the need of the program, for had there been a definite plan to educate the community to the importance of seeking early treatment and had there been the machinery to bring fresh contacts in for treatment, in the majority of instances with proper guidance complications would not have developed in these cases. It is to be understood also that our present medical armamentarium for the treatment of gonorrhea is far from approaching that for the treatment of syphilis. Neither do we have exact diagnostic means as with syphilis. Consequently, the program must be adapted to suit local situations. As in the case of syphilis control, the objective should be quality instead of quantity with concentration on stimulating prompt reporting of acute cases. From a public health point of view, these are the cases that require special emphasis, and from the standpoint of clinic management, these are the cases in which sulfonamides will have their greatest effect.

It is contended that because of the limitation of diagnostic and therapeutic procedures, cures can not be insured, and the reappearance of infections may go unnoticed, thereby producing a false sense of security, both from an individual and a public health standpoint. This situation may exist in some instances in clinics not thoroughly equipped. The possibility should not be ignored, and for that reason patients should be kept under observation for two to three months after an apparent cure. One must realize, however, that the primary objective of a public health program is the prevention of new cases. If, despite the limitations, by prompt action fresh infections are rendered noninfectious with the sulfonamides even for a short period of time, many potential infections have been eliminated. Epidemiologically we have accomplished our purpose. We have located and brought under control infectious cases; the patients can be instructed to protect themselves and others during the period of infection and can be observed for any evidence of relapse.

CONCLUSION

Specifically then, what steps should the health officer take to include an active program of gonorrhea control in his health department? As stated previously, they depend a great deal on local facilities available. Where there are ample laboratory facilities and expert medical consultants, the program can be all inclusive. Where these facilities are lacking, the program should be modified to fit the facilities available. The Division of Venereal Disease Control gladly offers to all health officers its consultative service for this purpose. In all health departments, however, there should be an active program of gonorrhea control. In a general sense, the program should include the following points:

1. Concentration of effort on the groups most likely affected.

2. Equal emphasis on the dissemination of information concerning gonorrhea, as is done for syphilis. On releasing information to the press and at meetings relative to the venereal diseases,

gonorrhea should be publicized as much as syphilis.

3. Acquaintance with new advances in the diagnosis and treatment of gonorrhea so that the program may be intelligently directed.

4. Application with equal force of the same procedure relating to epidemiologic considerations, case finding and case holding that are applied to syphilis.

5. Sulfathiazole is replacing the other sulfonamides in the treatment of gonorrhea. For this reason, this drug should be the drug of choice for clinic management.

6. Adjustment of the program to include active participation of private practitioners.

In allocating to health departments future allotments of funds for control of venereal diseases a share of these allotments will be expected to be used for purposes of gonorrhea control. It is hoped, therefore, that on reporting future activities regarding control of venereal disease to the Division, the case for gonorrhea control will not be ignored.

The private physician, as well as the public health official, must no longer view gonorrhea as the illegitimate member of the family of diseases and beyond the pale of medicine, but must face the disagreeable fact that owing to their indifference, the gonococci have been riding merrily on, producing an untold amount of havoc, suffering and death, and have fattened the purses of the unethical physician, the unscrupulous druggist and the ever-demanding quack.

Box 210.

WAR RATIO OF MALE TO FEMALE BIRTHS

The normal proportion of male births over female births was even greater in every European belligerent power during the last years of World War I and for perhaps two or three years afterward, the Journal of the American Medical Association for November 22 says in answer to an inquiry. The Journal continues,

> The proportion of male births increased also in many of the important European neutral countries, including Norway, Sweden, the Netherlands and (for the year 1920) Switzerland. There was an observable rise in Australia, but not in the United States or in New Zealand, among the non-European belligerents. The increase in the proportion of male births, where observed was of short duration.

As for the reasons for this increase, the Journal says that a simple explanation which seems entirely adequate has not yet been offered.

THREE CASES OF CANCER IN CHILDREN UNDER THREE YEARS OF AGE

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It was my impression that malignant growths in childhood occur rarely, but after reviewing the literature, I find I was mistaken. Prenatal cases occurring before the fetus is fully developed have been reported. In a most interesting and scientific paper, entitled "Neoplastic Diseases in Infancy and Childhood," Blacklock[1] stated in 1934 that the occurrence of new growths in the early years of life, though rare, nevertheless merits a place in the differential diagnosis of the diseases of childhood. During the ten year period from 1924 to 1933 the total admissions to the Royal Hospital for Sick Children of Glasgow, he reported, were 58,331, and of these 1,454, or 2.47 per cent, were classified as suffering from simple or malignant tumors. Of these tumors 400 were examined microscopically.

The simple tumors, of which there were 300, showed little difference from those found in adults, he observed; there were 50 epithelial tumors, 37 mesoblastic connective tissue tumors, 151 angiomas and 62 cysts.

Creite[2] in 1905 reported the case of a child 2 years and 2 months old suffering from carcinoma of the penis characterized by a severe priapism that had existed for eight days prior to examination. The child died several weeks later. Among the tumors of the penis, carcinoma is one of the most frequent in occurrence, and about one third of all such cases fall within the sixth decade of life, this author observed. Of 616 cases in his series, no patient was younger than 20 years and in the literature he found no case recorded in which the patient was of the age of this child.

Five cases of ovarian tumor occurred among the 12,260 cases treated surgically at the Children's Hospital in Boston during the ten year period ending in 1929, according to Lanman.[3] The ages of the children were 6½ months, 5 months, 6½ years, 10 years and 11 years. All were operated upon, and only two were living at the time of his report. A medullary carcinoma of the ovary was found at operation and successfully removed in the case of a 5 year old girl, which was reported by Rosanoff[4] in 1911. The tumor, first noticed by the mother four

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weeks prior to examination, had soon increased in size and had become painful.

In discussing the 100 cases of malignant tumor in his series of 400 cases of neoplastic disease in children, Blacklock[4] observed:

> If we exclude the cerebral tumours which produce symptoms associated with intracranial pressure, all the other malignant neoplasms occurring in children have certain symptoms in common. In our series slight intermittent fever was present in all of them, and was often the first symptom to draw attention to the fact that the child was ill. There was nearly always a moderate secondary anemia, usually with a slight increase of leucocytes, some of which were immature forms, e. g. myelocytes. Emaciation such as seen in cases of malignant growths in adults was not a marked feature in these children until the later stages. On the other hand, symptoms due to pressure of the tumour were more marked than in adults; for example, abdominal tumours often produced ascites, enlargement of the superficial veins, and venous congestion of the lower limbs with oedema. Tumours arising from the kidney or suprarenal occasionally caused pressure on, or actually invaded the left spermatic vein, and so produced varicocele on that side.

Of the 100 malignant tumors in this author's series, 6 were classified as teratomas, 4 sacrococcygeal and 2 ovarian; 7 were carcinomas, 2 of the ovary, 1 of the kidney and 4 of the liver; 21 were blastocytomas of the kidney; 33 were sarcomas, 12 lymphosarcomas, 5 mixed cell, 4 spindle cell, 5 of the bone and 7 myeloid; 32 were of neurogenous origin, 20 of the glioma group and 12 sympathicoblastomas; and 1 was an endothelioma of the hemangio-endothelioma type. Of the total number, 52 occurred within the abdomen and 48 elsewhere.

This author continued:

> It will be seen that sarcomata were found to be the commonest malignant tumour in early life, accounting for 33 per cent, and then in order of frequency, the nephroblastomata (21 per cent), gliomata (20 per cent), sympathicoblastomata (12 per cent), carcinomata (7 per cent), and malignant teratomata (6 per cent). Schultz (1926), on the other hand, found that malignant tumours were most frequent in the kidneys, and then, in order, in the eyes and in the bones. Warthin (1915) found that of 2,000 malignant tumours all examined microscopically 20.1 per cent occurred in children under 15 years. The largest number of malignant tumours in the present series occurred in the second and third years of life (table III), the greater frequency at these ages being due to the large number of two embryonic neoplasms, viz., nephroblastomata and sympathicoblastomata. Sarcomata and gliomata were more frequent after the third year of life than before that age. Little difference was found in the sex incidence of these malignant tumours, 52 per cent being in males and 48 per cent in females.
>
> TREATMENT. The success of any treatment of these malignant tumours of childhood depends on early diagnosis. As far as our series of tumours is concerned, surgical removal where possible proved of limited value, as in the great majority of cases the tumour recurred. Whether a more extensive use of radium or deep x-ray therapy before and after surgical removal of the main tumour would be of any value is a point worthy of discussion. As far as literature on the subject shows, both radium and x-ray therapy have, however, not been very successful. This seems rather paradoxical, for the majority of these tumours are composed of very primitive cells, which should be very sensitive to radium or deep x-ray therapy.

Scheffey and Crawford[5] reported in 1932 what they believed to be the earliest case on record of an adenocarcinoma in a child originating in or limited to the cervix uteri. The patient was a 22 month old child admitted to the hospital because of slight and intermittent vaginal bleeding of four weeks' duration, unaccompanied by pain. Prior to this disturbance, they stated, the child had appeared to be healthy and normal in every respect.

As early as 1907 Petrone[6] recorded a case of primary adenocarcinoma of the liver in a 4 month old infant still nursing. The mother related that the girl, in excellent condition and developing rapidly at first, had for two months experienced a gradual and progressive loss of weight; also, during the fifteen days prior to consultation she had observed an increase in the size of the abdomen and had noticed that the stools had become fetid during this same period.

In 1935 Jamieson[7] reported a case of primary carcinoma of the liver in a boy aged 3½ in whom the tumor was single and of the massive type. Until eight weeks before his death, he had had no illness and had been observed by this author as a bright, healthy-looking boy of fair development for his age.

In reporting a case of primary carcinoma in an infant, Pierson and Campbell[8] mentioned a case described by Taillens in 1930 and directed attention to the report of Kilfoy and Terry, published in 1929, in which they recorded a case and reviewed 43 others, 16 of which they regarded as authenticated. These authors stressed the importance of considering carcinoma of the liver in differential diagnosis of tumors of the abdomen in children. Their patient at the age of 11 months had developed a diarrhea which proved resistant to treatment. Three months later his mother had noticed a mass in the right side of the abdomen. Examination revealed a hemoglobin estimation of 39 per cent Sahli, enlargement of the right side of the abdomen and a hard mass, apparently the right kidney although it was inseparable from the liver, which was definitely a hand's breadth below the margin of the ribs. These authors concluded that the clinical symptoms of primary carcinoma of the liver are few and in no way characteristic since they depend on the effects of pressure by the tumor and on necrosis and hemorrhage in its substance. They

added that jaundice is rare and that the metastases are intrahepatic, occasionally extending to the lungs.

A report of three cases, which occurred in my practice four or five years ago, follows:

REPORT OF CASES

Case 1. A white boy aged 4 came under my observation because he had been vomiting that morning and was unable to retain anything on his stomach. He appeared to be in good physical condition as he was plump and well nourished, and he was in no pain. After listening to his mother's account of the attack, I was about to order small doses of calomel, thinking the condition was occasioned by an upset stomach. In passing my hand over the abdomen, however, I detected an enlargement in the upper quadrant. Upon closer examination I found a mass filling the epigastrium. I informed the parents that the case required surgery. The child was taken to the hospital and operated upon immediately. An inoperable cancer involving the stomach, intestines and liver was found. The patient survived only a few hours. The mass had involved the pyloric orifice of the stomach, closing it entirely, hence the vomiting. Here was a case in which the mother had noticed nothing wrong until vomiting developed. There were no previous symptoms that a fond mother would have noticed leading her to seek aid and advice from the family physician. It was the first case of cancer that I had seen in the very young.

Case 2. A white boy aged 2 was brought to me from Wakulla County for examination. There was a history of frequent painful efforts at micturition. With each desire to urinate, he passed a few drops of urine as he danced and jumped about, crying out in great pain. I at first thought of an obstruction and introduced a catheter with no difficulty. In examining over the bladder, just above the symphysis, I felt a lump. Examination by rectum revealed a definite tumor of the bladder. Dr. Johnson opened the bladder and found a tumor about the size of a lemon, growing from the base of the bladder. It was successfully removed, but the little fellow only lived two weeks after the operation.

Case 3. A colored boy aged 15 months was brought to me by his mother. She stated that he had had trouble with the left eye some months previously. The condition had grown steadily worse and Dr. Brown had enucleated the left eyeball because of a glioma. As there was no improvement she consulted me as she did every physician in town. I had a picture made which shows the destruction wrought by the cancer. The child lived only a few weeks thereafter.

Singularly enough, prior to observing these cases, I had not in an experience of 45 years' general practice seen cancer in a patient under 28 years of age. Then within a period of six months these 3 cases came under my observation. Cancer in the young occurs more frequently than one would suppose. Certainly for youthful patients the disease is more often fatal than in elderly patients. Physicians should be on the lookout for these cancerous conditions. The earlier they are recognized, the better are the results of operation.

CONCLUSION

What is the bearing of these tumors of childhood on the more frequently occurring tumors of adult life? Nearly all of these neoplasms of children take origin from rests of undifferentiated or embryonic cells. This suggestion was first made by Cohnheim as the explanation of all tumors, but in recent years it has been put aside in favor of the chronicirritation theory. Nevertheless, Cohnheim's hypothesis still holds good for nearly all tumors of childhood. Cell rests are of fairly common occurrence in the tissues of children, but it is difficult to explain what causes these rests to proliferate wildly and become invasive. This problem still awaits solution.

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Box 547.

FIND SYPHILIS RATE OF 4.52% AMONG FIRST MILLION SELECTEES

"A rate of 45.2 cases of syphilis per thousand persons examined was found through physical examinations and routine serologic blood tests of the first million selectees and volunteers called for classification under the Selective Service Act of 1940," R. A. Vonderlehr, M.D., and Lida J. Usilton, M.A., Washington, D. C., reported in The Journal of the American Medical Association for October 18. They said:

The greatest prevalence of syphilis among the selectees and volunteers was reported by Florida and South Carolina, with rates of 170.1 and 156 cases per thousand respectively. The lowest rate, of 5.8 per thousand, was reported by New Hampshire. Seven Southern States and the District of Columbia reported rates in excess of 100 cases per thousand. The rate for Negroes is consistently higher than that for white men in all the states. There are indications that high rates among the white are coincidental with high rates among the Negroes. For the country as a whole, the prevalence of syphilis among Negro selectees and volunteers is thirteen times that for the white. In twenty states and the District of Columbia the Negro rate is in excess of ten times that of the white rate.

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PRECONVENTION MEETING

Annual reports of councilors will be read at the preconvention meeting to be held in Jacksonville at the Seminole Hotel, Sunday, January 4. There will be a luncheon at 12:30 noon, followed by a general session. After being read, councilors' annual reports are to be turned in for publication in the Journal.

Sunday forenoon various regular committees of the Association will hold meetings but will adjourn in time for all to attend the luncheon and general session. The Association's Committee on Scientific Work will select the essayists who are to read papers at the annual meeting in Palm Beach. Members of the State Association who wish to make application for a place on the scientific program are urged to mail their applications at once to Dr. Herbert E. White, Box 1018, Jacksonville.

All members of the State Association are cordially invited to attend the preconvention meeting at the Seminole Hotel in Jacksonville, Sunday, January 4.

MEDICAL DIVISION OF CIVILIAN DEFENSE ISSUES BULLETIN NO. 2

The thoroughness with which the Medical Division of the Office of Civilian Defense is preparing to meet civilian emergency needs associated with disasters is shown in the Division's Bulletin No. 2, published in the November 22 issue of The Journal of the American Medical Association. This bulletin concerns itself with the equipment and operation of Emergency Medical Field Units.

The bulletin explains that an emergency medical field unit is "a group of physicians, nurses, orderlies and volunteer nurses' aides organized, equipped and trained for field casualty service in the event of a disaster."

This unit operates from what is known as a casualty station and is so organized and equipped that it can be instantly subdivided into squads and teams for service at the actual site of disaster.

The recommended equipment listed in the bulletin is uniform and conforms as far as possible with that of the Medical Department of the U. S. Army. In addition to listing the minimum medical and surgical equipment for the first aid post, which is the advance unit of the casualty station, the equipment for the latter also is enumerated. For the first aid post the working supply for one physician's team includes the instruments essential for minor surgery, drugs, dressings and bandages and suture material. The equipment for a casualty station includes bulky articles which could not be included in the equipment of the first aid post without impairing its mobility.

MEDICAL DISTRICT MEETINGS

HOLLYWOOD, BARTOW, ORLANDO

The fifth annual meetings of the Southeast, Southwest and South Central Districts were held on the afternoons of October 30, 31 and November 1, respectively. They were well attended, as indicated by the registration which follows.

SCIENTIFIC SESSIONS

The scientific programs were informative and interesting. Essayists were well prepared and their papers evoked a great deal of discussion. The programs are shown by districts.

HOLLYWOOD

Presiding, Dr. W. Duncan Owens, Junior Councilor.
"Digitalis Poisoning," Dr. E. C. Chamberlain, Ft. Lauderdale.
"Unrecognized Importance of Minor Injuries," Dr. Lloyd J. Netto, West Palm Beach.
Address (By Invitation), "The Role of the Physician in Defense," Dr. Gilbert S. Osincup, Orlando.

BARTOW

Presiding, Dr. H. V. Weems, Senior Councilor.
"The Use of the Miller-Abbott Tube in Cases of Intestinal Ileus" (Lantern Slides), Dr. David R. Murphey, Jr., Tampa.
"Spinal Anesthesia," Dr. Joseph J. Ruskin, Tampa.
Address (By Invitation), "Rehabilitation of Child Following Anterior Poliomyelitis," Dr. Arthur H. Weiland, Coral Gables.

ORLANDO

Presiding, Dr. Carl D. Hoffmann, Senior Councilor.
"Relation of Vitamin B Complex to Human Pathology," Dr. T. M. Rivers, Kissimmee.
"The Use of Eucupin Solutions in the Production of Prolonged Postoperative Analgesia in Rectal Surgery" (Lantern Slides), Dr. Don C. Robertson, Orlando.
Address (By Invitation), "Diabetes and Arteriosclerosis," Dr. Arthur L. Walters, Miami Beach.

FIRST GENERAL SESSIONS

At Hollywood the first general session was called to order in the Palm Room of the Hollywood Beach Hotel by Dr. R. L. Elliston, senior councilor. The address of welcome was given by Dr. Frank Denniston, president of the Broward County Medical Society. Dr. C. Larimore Perry, on behalf of the Dade County Medical Society, extended an invitation to the group to meet at Miami in 1942. By unanimous vote the invitation was accepted.

At Bartow Dr. H. V. Weems, senior councilor, called the first general session to order in the auditorium of the Civic Center. After an address of welcome by Dr. Bruce R. Tinkler, president of the Polk County Medical Society, Dr. J. C. Patterson, representing the Sarasota County Medical Society, invited the members of the Southwest Medical District to meet in Sarasota the following year. His invitation was unanimously accepted.

At Orlando Dr. C. D. Hoffmann, senior councilor, called the meeting to order in the Club Room of the Orange Court Hotel. In the absence of Dr. Frank D. Gray, president of the Orange County Medical Society, Dr. Hoffmann gave the address of welcome. On behalf of the Brevard County Medical Society, Dr. Frank N. Cooke invited the group to meet in Cocoa in 1942. By unanimous vote the invitation was accepted.

SECOND GENERAL SESSIONS

Addresses by President Walter C. Jones, Secretary Shaler Richardson and Dr. Duncan Owens, chairman of the Council, as well as verbal reports from Dr. Gilbert S. Osincup, president-elect, and the chairmen of regular committees were of especial importance. Dr. H. D. Van Schaick, chairman of the Association's Committee on Legislation and Public Policy, was present at all six district meetings to make his report.

Dr. Jones explained some of the handicaps encountered by the president in making committee appointments, which are the result of the present boundaries of committee districts. He illustrated his point by directing attention to the difference between the medical population of District B, which totals 88, and that of District F, which totals 425. An incoming president is required to make as many appointments from the 88 members in District B as from the 425 members in District F. It was suggested that the number of committee districts be reduced from six to four and that the geographical boundaries be rearranged so as to equalize, as nearly as possible, the number of members in the four districts. Dr. Jones presented an outline map showing the present setup and the suggested changes.

Dr. Richardson explained that through the cooperation of the State Medical Association, the State Board of Health and the State Board of Medical Examiners, a definite move has been made to rid the state of violators of the Medical Practice Act. The machinery has been set up under the State Board of Health, which is an arm of the state government, and the results so far have been gratifying. He requested that members report promptly all instances of violation in order that proper legal steps may be taken to bring the offenders to justice.

Dr. Owens discussed some of the difficulties encountered in securing essayists for the scientific

programs. He urged those who wished places on next year's programs to file their applications with him as early as possible. He also supplemented Dr. Jones' comments on the rearrangement of districts, and explained how the proposed changes would affect the activities of the Council and of the district meetings.

The fact that these problems were presented at each district meeting, and that advice and counsel were sought from the members, is evidence that the officers are striving to have all units of the Association working in harmony and to the best interest of the membership as a whole.

Interesting reports were given by representatives of the following committees: Medical Postgraduate Course, Legislation and Public Policy, Public Relations, Executive, Scientific Work, State Controlled Medical Institutions, and Cancer Control.

The second general session of a district meeting is informal in character and affords a splendid opportunity for the members to discuss in round table fashion the problems that beset the medical profession.

ENTERTAINMENT

The local committees on arrangements of the host societies royally entertained members, guests and ladies. A social hour was scheduled at each meeting for 6 p. m., followed at 7 p. m. by a delightful dinner. In charge of the arrangements at Hollywood were Drs. O. C. Brown, Leigh F. Robinson and R. L. Elliston; at Bartow, Drs. L. L. Lancaster, W. F. Peacock and J. G. Gilchrist; at Orlando, Drs. Charles J. Collins, R. P. Henderson and Carl D. Hoffmann.

By unanimous vote those in attendance expressed deep appreciation to the members of the entertaining societies, the hotel officials, city officials, newspapers and others who contributed to the success of the district meetings.

WOMAN'S AUXILIARY

At each of the district meetings the Woman's Auxiliary held an official meeting, with officers present from the State Auxiliary. A writeup, giving the full details in connection with the meetings of the ladies will be found on the Woman's page of the Journal.

REGISTRATION

HOLLYWOOD—DISTRICT F

The total registration was 147, of which number 103 were Association members (from this district, 97), 8 were visitors and 36 were ladies.

Officers: W. Duncan Owens, Miami Beach, chairman of Council; R. L. Elliston, Ft. Lauderdale, senior councilor; Stewart Thompson, Jacksonville, managing director.

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Miami: James L. Anderson, L. L. Andrews, H. A. Barge, W. J. Barge, E. C. Brunner, C. P. Bullard, F. H. Dieterich, P. L. Dodge, L. W. Dowlen, James O. Elam, Marshall Faver, J. Raymond Graves, Winston F. Harrison, Jack Humphreys, Thomas W. Hutson, Walter C. Jones, Alexander Kushner, Carlos P. Lamar, W. T. Lanier, Frederick LeDrew, Alfred G. Levin, Taylor Lewis, George D. Lilly, J. M. McClamroch, Ed. H. Mabry, P. J. Manson, James H. Mendel, Claude G. Mentzer, R. M. Oliver, William Pallister, Homer Pearson, Nelson T. Pearson, C. Larimore Perry, Kenneth Phillips, Jack O. W. Rash, Homer A. Reese, Ralph S. Sappenfield, Joseph S. Stewart, Edwin C. Thomas, F. A. Vogt, W. H. Watters, P. B. Welch.

Miami Beach: Milton G. Bohrod, W. A. Christian, James R. Cogan, O. S. Dowlen, George N. Leonard, Robert A. Mayer, Donald G. Stannus, E. J. Thomas, Arthur L. Walters. *Miami Springs*: Estella G. Norman. *Orlando*: Gilbert S. Osincup. *Palm Beach*: S. Richard Ombres, W. Y. Sayad, B. B. Sory, Jr., W. B. Wilkins. *Pompano*: George S. McClellan, S. A. Winsor. *Raiford*: O. L. Kelley. *West Palm Beach*: Wilbur O. Arnold, W. E. Bippus, Victor Clarholm, Thomas E. Daly, F. K. Herpel, David W. Martin, K. E. Montgomery, Lloyd J. Netto, L. M. Rozier, James R. Sory, Edgar W. Stephens, William H. Weems.

Visitors—Fort Lauderdale: William J. Bailey, Otto W. Schwalb. *Jacksonville*: R. C. Hood. *Miami*: W. W. Davies, Guy Fish. *West Palm Beach*: Joseph C. Bernstein. *New York City*: Maurice A. Sturm.

Ladies—Coral Gables: Mrs. Winston Harrison, Marie Louise Smith, Mrs. H. W. Willis. *Ft. Lauderdale*: Mrs. O. C. Brown, Mrs. Russell B. Carson, Mrs. E. C. Chamberlain, Mrs. Frank Denniston, Mrs. D. W. Harris, Mrs. John Allen Johnston, Mrs. M. A. Lovejoy, Mrs. H. J. Peavy, Mrs. C. A. Peterson, Mrs. Leigh F. Robinson, Mrs. Otto W. Schwalb, Mrs. Paul G. Shell, Mrs. Lawrence Stepp, Mrs. R. H. Stovall. *Hollywood*: Mrs. Elbert McLaury. *Jacksonville*: Mrs. L. Y. Dyrenforth. *Miami*: Mrs. W. J. Barge, Mrs. P. L. Dodge, Mrs. George D. Lilly, Mrs. P. J. Manson, Mrs. Robert M. Oliver, Mrs. William Pallister. *Miami Beach*: Mrs. Martha Morrissey. *Orlando*: Mrs. Gilbert S. Osincup. *Palm Beach*: Mrs. S. Richard Ombres, Mrs. W. Y. Sayad. *West Palm Beach*: Mrs. Wilbur O. Arnold, Mrs. Victor Clarholm, Mrs. Thomas E. Daly, Mrs. F. K. Herpel, Mrs. David W. Martin, Mrs. Lloyd J. Netto. *New York—Bronxville*: Mrs. Arthur Bradley.

BARTOW—DISTRICT D

The total registration was 86, of which number 59 were Association members (from this district, 49), 6 were visitors and 21 were ladies.

Officers: W. Duncan Owens, Miami Beach, chairman of Council; H. V. Weems, Sebring, senior councilor; Stewart Thompson, Jacksonville, managing director.

Arcadia: H. P. Bevis, J. A. Simmons. *Avon Park*: I. W. Chandler. *Bartow*: J. G. Gilchrist, J. L. Hargrove, R. L. Hughes, L. L. Lancaster, W. F. Peacock, Cecil H. Wilson. *Bowling Green*: W. S. Pyatt. *Brad-*

enton: C. W. Larrabee, W. D. Sugg, W. E. Wentzel. *Coral Gables*: Arthur H. Weiland. *Dunedin*: J. A. Mease. *Ft. Meade*: G. H. Carefoot. *Jacksonville*: L. Y. Dyrenforth, Robert B. McIver, J. N. Patterson, Shaler Richardson, H. D. Van Schaick. *Lakeland*: J. R. Boulware, Jr., R. L. Cline, Henry Fuller, Fred S. Gachet, J. M. Kibler, Herman Watson.

Lake Wales: B. Y. Pennington, B. R. Tinkler. *Miami*: Walter C. Jones. *Orlando*: L. C. Ingram, G. S. Osincup. *St. Petersburg*: W. C. McConnell. *Sarasota*: John M. Butcher, J. E. Harris, John Jares, A. Lamar Matthews, A. O. Morton, J. C. Patterson, Millard B. White. *Sebring*: Leland H. Dame. *Tampa*: W. P. Adamson, C. A. Andrews, W. C. Blake, H. G. Cole, J. C. Dickinson, James L. Estes, Charles M. Gray, R. Bradner Mertz, Frank C. Metzger, David R. Murphey, Jr., Joseph J. Ruskin, W. W. Trice, Jr., J. C. Vinson, E. Bryant Woods. *Wauchula*: M. C. Kayton. *Winter Haven*: Waldo Horton.

Visitors—Bowling Green: J. M. Philpot. *Miami*: W. W. Davies. *Tampa*: L. W. Hewit, A. F. Massaro, Wesley W. Wilson.

Ladies—Arcadia: Mrs. H. P. Bevis, Mrs. Edith French, Mrs. John A. Simmons. *Bartow*: Mrs. J. G. Gilchrist, Mrs. J. L. Hargrove, Mrs. L. L. Lancaster, Mrs W. F. Peacock. *Ft. Meade*: Mrs. G. H. Carefoot. *Jacksonville*: Mrs. H. D. Van Schaick. *Lakeland*: Mrs. R. L. Cline. *Lake Wales*: Mrs. B. Y. Pennington. *Miami*: Mrs. W. J. Barge, Mrs. M. A. Otterson. *Orlando*: Mrs. L. C. Ingram, Mrs. Gilbert Osincup. *St. Petersburg*: Mrs. W. C. McConnell. *Sebring*: Mrs. Leland H. Dame, Mrs. H. V. Weems. *Tampa*: Mrs. H. G. Cole, Mrs. J. C. Griffin, Mrs. Stephen Gyland.

ORLANDO—DISTRICT E

The total registration was 61, of which number 42 were Association members (from this district, 33), 4 were visitors and 15 were ladies. ,

Officers: W. Duncan Owens, Miami Beach, chairman of Council; C. D. Hoffmann, Orlando, senior councilor; Stewart Thompson, Jacksonville, managing director.

Cocoa: F. N. Cooke. *Eustis*: C. M. Tyre. *Jacksonville*: L. Y. Dyrenforth, Robert B. McIver, J. N. Patterson, Shaler Richardson, Harold D. Van Schaick. *Kissimmee*: T. M. Rivers. *Miami*: Walter C. Jones, Ralph S. Sappenfield. *Miami Beach*: Arthur L. Walters.

Orlando: Thomas C. Black, Warren A. Brooks, H. H. Caffee, C. J. Collins, H. A. Day, J. G. Economou, R. P. Henderson, Edgar E. Hitchcock, L. C. Ingram, E. L. Jewett, Hewitt Johnston, John A. Kelk, H. S. Knowles, Duncan McEwan, Fred Mathers, Louis M. Orr, G. S. Osincup, J. A. Pines, W. P. Rice, Don C. Robertson, Joseph G. Seltzer, W. E. Sinclair, W. Henry Spiers, R. D. Thompson, Richard H. Walker, Jr., Walter A. Weed. *Oviedo*: J. William Martin. *Sanford*: J. N. Tolar. *Winter Park*: Ruth S. Hart.

Visitors—Jacksonville: R. C. Hood. *Orlando*: V. Frankfurth. *Sanford*: O. L. Barks.

Ladies—Cocoa: Mrs. F. N. Cooke. *Jacksonville*: Mrs. Lucien Y. Dyrenforth, Mrs. H. D. Van Schaick. *Miami*: Mrs. W. J. Barge, Mrs. M. A. Otterson. *Miami Beach*: Mrs. Duncan Owens. *Orlando*: Mrs. Charles J. Collins, Mrs. V. Frankfurth, Mrs. L. C. Ingram, Mrs. H. S. Knowles, Mrs. Duncan McEwan, Mrs. G. S. Osincup, Mrs. W. E. Sinclair. *Sanford*: Mrs. O. L. Barks, Mrs. J. N. Tolar.

BIRTHS

Dr. and Mrs. James G. Lyerly of Jacksonville announce the birth of a son, Thomas Jackson, November 28.

Dr. and Mrs. R. L. McDaniel of Jacksonville announce the birth of a son, Jerry Wheeler, November 26.

Dr. and Mrs. B. D. Carroll of Miami announce the birth of a daughter, Beverly Ann Carroll, November 22.

STATE NEWS ITEMS

Dr. T. C. Kenaston, Cocoa, was in New York during the month of October, where he took postgraduate work.

Dr. E. H. Roberts, Jacksonville Beach, attended a national medical clinic in Minneapolis, Minn., during the month of October.

The following Florida doctors attended the Tulane postgraduate clinics at Charity Hospital in New Orleans, during the month of October: Dr. S. H. Adams, Tampa; and Dr. John E. Maines, Lake Butler.

Dr. C. C. Webb of Pensacola took postgraduate work in surgery at the Cook County Hospital in Chicago during the month of November.

Dr. Shaler Richardson, Jacksonville, tendered his resignation to Governor Holland as a member of the State Board of Health on November 3. Dr. Richardson was appointed to membership on the Board early in 1936 by Governor Sholtz and was elected president in 1941, following the death of the former president, Dr. N. A. Baltzell. In tendering his resignation, Dr. Richardson gave as his reason insufficient time to devote to the ever increasing volume of work of the State Board, and at the same time to do justice to his private practice and official duties of the Florida Medical Association.

Essayists for the scientific sessions at the Association's annual convention in Palm Beach will be selected by the Committee on Scientific Work at its meeting to be held Sunday, January 4. All members of the State Association who wish to read papers at the annual convention are urged to file their applications at once with Dr. Herbert E. White, chairman of the Committee. Dr. White has announced that no general letter calling for applications will be mailed to the entire membership of the Association, as was done last year. All applications should be addressed to Dr. Herbert E. White, Box 1018, Jacksonville.

Dr. George G. Oswalt, Mobile, Ala., was chosen president of the Gulf Coast Clinical Society at its sixth annual meeting in Pensacola, October 16. Drs. Donald G. Rafferty, Pass Christian, Miss., and Sidney G. Kennedy, Jr., Pensacola, were named vice presidents. Dr. Charles L. Rutherford, Mobile, is the secretary. The 1942 session will be held in Mobile. The program included papers by Drs. Edgar Burns, New Orleans, on "Treatment of Urinary Infections;" James S. McLester, Birmingham, "Functional Disorders of the Digestive Tract;" Philip S. Hench, Rochester, Minn., "Management of Chronic Arthritis;" and Warren T. Vaughan, Richmond, Va., "Allergic Factor in Certain Dermatoses."

Members of the Florida Medical Association who attended this meeting were:

Century: J. I. Turberville, J. S. Turberville. *Chipley*: F. M. Watson. *Crestview*: R. E. Enzor. *DeFuniak Springs*: E. L. Huggins. *Eustis*: W. L. Wood. *Graceville*: R. L. Miller. *Milton*: J. C. Holley, Rufus Thames. *Panama City*: J. M. Nixon. *Pensacola*: A. M. Ames, E. V. Anderson, J. D. Bell, Charles A. Born, Herbert L. Bryans, A. C. Carter, Gustav N. Click, J. P. Daniels, M. W. Dodson, J. H. Fellows, L. C. Fisher, H. B. Haisfield, H. O. Heath, W. P. Hixon, James M. Hoffman, S. G. Kennedy, M. A. Lischkoff, John J. McGuire, J. N. McLane, J. C. McSween, N. C. Mellen, A. E. Mock, G. W. Morse, R. G. Nobles, V. R. Nobles, W. C. Payne, J. H. Pierpont, W. S. Randall, Lee Sharp, A. L. Stebbins, R. P. Stritzinger, R. L. Sullivay, Herbert Virgin, Jr., C. C. Webb, A. W. White, W. L. Williams. *Port St. Joe*: Albert L. Ward. *Quincy*: W. W. Massey. *Tallahassee*: J. H. Pound.

Members of the State Association who attended the meeting of the American Public Health Association in Atlantic City, October 14-17, were: Drs. J. N. Patterson, William H. Pickett and Noble A. Upchurch, Jacksonville; and Dr. James R. McEachern, Tampa.

Doctors from Florida who attended the Thirty-Fifth Annual Meeting of the Southern Medical Association in St. Louis, November 10-13, were:

Century: J. K. Turberville. *Clearwater*: M. A. Nickle. *Coral Gables*: Warren W. Quillian. *Jacksonville*: J. L. Borland, Alan Brown, F. A. Copp, Frank L. Fort, F. W. Krueger, Thomas H. Lipscomb, John F. Lovejoy, Robert B. McIver, H. Marshall Taylor. *Miami*: Ralph F. Allen, James O. Elam, Walter C. Jones, James J. Nugent, Frank M. Woods. *Miami Beach*: Harold A. Ryan, Harrison A. Walker. *Miami Springs*: James R. Jeffrey, Jr. *Orlando*: E. L. Jewett, Louis M. Orr. *Pensacola*: Carol C. Webb. *Plant City*: Edgar Austin. *Tampa*: James C. Griffin, Jr., J. R. McEachern. *West Palm Beach*: Lloyd J. Netto, Harry A. Wakefield. *Winter Park*: Ruth S. Hart.

Dr. Maurice J. Rose announces the opening of additional offices at the Ingraham Building, Miami. His practice is limited to obstetrics and gynecology.

Dr. J. R. Jeffrey, Miami Springs, attended the Inter-State Postgraduate Assembly in Minneapolis, Minn., and spent three weeks at the Cook County Postgraduate Medical School in Chicago during the month of November.

Florida doctors who attended the meeting of the American College of Surgeons in Boston, November 3 to 7, were:

Bradenton: William D. Sugg. *Coral Gables*: Charles R. Burbacher. *Daytona Beach*: J. Ralston Wells. *Gainesville*: Edwin H. Andrews, John E. Maines, Jr., William C. Thomas, George C. Tillman. *Hollywood*: F. L. Snyder. *Jacksonville*: Charles B. Mabry, Kenneth A. Morris, Frederick J. Waas, E. C. Watt. *Lakeland*: S. Edgar Watson. *Miami*: Gail E. Chandler, John T. Macdonald, James J. Nugent. *Miami Beach*: Harold A. Ryan. *Orlando*: J. R. Chappell, Frank D. Gray, Palmer R. Kundert, John S. McEwan. *Tampa*: Joseph W. Taylor. *West Palm Beach*: George M. Dawson, Vale D. Stone.

COMPONENT COUNTY SOCIETIES

DADE

The regular meeting of the Dade County Medical Society was held at 8:30 p. m. on Wednesday, November 5, at the Jackson Memorial Hospital. The scientific program consisted of a talk, illustrated with lantern slides, on "Gunshot Wounds of the Abdomen" by Drs. James McClamroch and Richard Fleming. Discussors were Drs. Sam Elder and C. Larimore Perry.

DUVAL

Dr. Gerry R. Holden was principal speaker at a meeting of the Duval County Medical Society held on the evening of November 4 at the library of the State Board of Health. His subject was "Treatment of Menopausal Symptoms in Women with Especial Reference to the Use of Diethyl Stilbestrol." This paper was discussed by Drs. J. N. Patterson, S. I. Kemp, James M. Bryant, Victor Hughes and William H. McCullagh.

A resolution on the death of Dr. Robert D. May, offered by Dr. F. L. Fort, chairman of the society's fraternal relations committee, was adopted.

HILLSBOROUGH

Capt. Richard C. Cumming of the army medical corps, stationed at Lakeland, was the principal speaker at the regular meeting of the Hillsborough County Medical Society, held at the Tampa Municipal Hospital, November 4. He discussed the physical and mental care of student pilots in training.

Medical officers stationed at MacDill and Drew fields were guests of the society at this meeting.

PALM BEACH

Members of the Palm Beach County Medical Society were the guests of the medical staff at the Morrison Field Air Base Hospital on the afternoon of November 6. An inspection of the hospital and medical facilities of the base was followed by dinner at the hospital mess.

Capt. J. G. Moore, doctor in charge of the medical unit at the base, was official host, greeting Dr. W. O. Arnold, president of the society, and his fellow members.

PINELLAS

On November 6 the Pinellas County Medical Society held a dinner meeting at the Shrine Club, St. Petersburg. Two papers comprised the scientific program: "Meralgia Paraesthetica," presented by Dr. W. M. Davis, discussed by Dr. W. H. McConnell and "New Conceptions in Endrocrinology," by Dr. A. J. Bieker, discussed by Dr. V. L. Hagan.

On the evening of November 20, a pediatric round table discussion was held by the society, at which Dr. C. C. Rudolph acted as moderator.

VOLUSIA

At a meeting of the Volusia County Medical Society held on the evening of November 10 at Deland, the society adopted three recommendations for the operation of the county health unit which is to be established early in January. They were:

1. Operation of the health unit under the direction of a county board of health to be appointed by the county commission and consisting of three physicians and two laymen.

2. Immunization of the indigent for smallpox and diphtheria by the health unit staff. Indigency should be decided by the physicians of the county, but with the provision that persons may apply for the immunization as indigents, in which case their applications should be investigated by welfare workers. All children should be immunized against these two diseases. Immunization later should be extended to typhoid and other diseases.

3. The health unit should cooperate with the State Board of Health in the control of venereal diseases.

ABSTRACT DEPARTMENT

Members of the Florida Medical Association who have had articles published in out-of-state medical journals are requested to forward such journals or reprints to Box 1018, Jacksonville, for abstracting in this department.

PLACENTA BILOBATA, TORPIN, RICHARD, AUGUSTA, GA., AND HART, B. F., WINTER PARK, FLA., AM. J. OBST. & GYNEC: **42**:38-49 (JULY) 1941.

Bilobate placenta occurred 355 times in all the deliveries at the University of Georgia School of Medicine, an incidence of 8 per cent. Its incidence roughly parallels that of pregnancy in general as regards age group, and does not seem related to abortion or early labor, suggesting a fortuitous rather than a pathologic endometrial cause. Bilobate placenta may vary from a small sessile appendage to a lobe equal in size to that of the primary placenta. If the extra lobe is separated from the primary lobe by membranes carrying vessels which supply the extra lobe, it is called placenta succenturiate.

In the study of these placentas it was shown that implantation of the ovum had taken place in or near a sulcus separating the two relatively flat surfaces of the anterior and posterior uterine walls. The only clinical significance which the authors noted was in cases in which the two lobes were attached anteriorly and posteriorly low in the uterine cavity to form a placenta praevia marginalis. They stated, "We are of the opinion that such an extensive condition surrounding the cervix anteriorly and posteriorly has been mistaken for placenta praevia centralis." The charts published in the body of the paper are of interest in showing the wide variation in the size of the accessory lobes.

From the study of the implantation of the placenta the authors wish to emphasize the following propositions:

"1. Chorionic villi surrounding the implanting ovum will grow and thrive in any adequate decidual soil available on any side of the ovum.

2. Chorionic villi die and become necrotic if decidual nourishment fails or if the villi are pulled away from their original bed.

3. Villi once displaced cannot take rest in other soil."

TOPICAL TREATMENT WITH SULFATHIAZOLE, SAMS, WILEY M., AND CAPLAND, LEWIS, MIAMI, ARCH. DERMAT. & SYPH. **44**:226-230 (AUG.) 1941.

The authors report the use of sulfathiazole in the treatment of diseases of the skin, chiefly impetigo and ecthyma. The drug is incorporated in 5 or 10 per cent concentration in an ointment with a cod liver oil base. In 53 cases the average healing time was cut from about three weeks to one week. The action seems to be a local one and not the result of absorption of the drug through the skin. In only one case did the sulfathiazole produce any sensitization of the skin. The results demonstrated by the authors agree with those reported from other clinics.

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A scientifically prepared formula for infants deprived of breast milk.

THIS IS HOW IT IS PREPARED . . . . . .

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2. Add enough warm, previously boiled water to make one ounce.

3. Cap bottle and shake into solution. Feed at body temperature.

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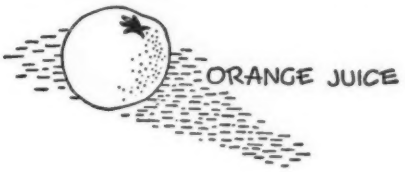
The quantity and number of feedings in 24 hours should be the same as that taken by the normal breast-fed infant.

THIS IS THE ONLY SUPPLEMENT REQUIRED . .



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BOOKS RECEIVED

Acknowledgment of books received will be made in this column and this will be deemed by us a full compensation to those sending them. A selection will be made for review as expedient.

ANNUAL REPRINT OF THE REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR 1940.—This volume contains not only all of the published reports of the Council for the preceding year but reports on products which were not deemed important enough to be published in The Journal. Council reports may be classified in general as those of omission or rejection, preliminary reports and status reports on drugs or on various therapeutic and pharmacologic problems. Representatives of all classes appear in this volume.

There are a number of interesting reports in the "non-acceptable" category. The one on the widely exploited Neurosine of the Dios Company sounds a timely warning on the hazards of bromidism and uncontrolled hypnotic medication. The report rejecting a number of preparations of gonadotropic hormone from the serum of pregnant mares, together with the report rejecting certain ovarian and ovarian anterior pituitary preparations, attest the Council's continued critical interest in the field of endocrinology. This is also indicated in the report on Desoxycorticosterone, written by Dr. Edgar S. Gordon and adopted by the Council for publication with a statement of the Council's attitude on the present status of adrenal cortex. The Council finds adrenal cortex therapy now in an unsatisfactory and unsettled state.

Two reports relegate to the therapeutic scrap heap the drugs Isacen and Melubrin: Isacen was accepted in 1926 as a non-toxic laxative or purgative; Melubrin is an antipyretic which seemed to have promise when it was accepted in 1913 but which the manufacturer has now ceased marketing. It is interesting to note that at the time these preparations were accepted the Council expressed some misgiving which later proved justified.

Noteworthy preliminary reports are on Guanidine Hydrochloride-Calco, which has been proposed for use in the treatment of myasthenia gravis, and Acetylglycarsenobenzene, a new antisyphilitic for intramuscular use, which the Council feels should be further perfected. In its report the Council comments with approval upon the manner in which the Winthrop Chemical Company has developed the latter and studied it before even considering its commercial production.

Among the nomenclature reports are those designating "Pyridoxine" and "Pyridoxine Hydrochloride" for Vitamin B6 and Vitamin B6 Hydrochloride; "Sulfathiazole" for 2-Sulfanilamidothiazole and "Sulfamethylthiazole" for 2-Sulfanilamido-4-Methylthiazole. Preliminary reports on these drugs as well as on Phenothiazine and Histaminase are included.

It is difficult to choose any among the so-called status reports for special mention—all are noteworthy for one reason or another. The report on the present status of the injection treatment of hernia is a continuation of the Council's consideration of this question. The Council has reached the decision that it is necessary to condemn the exploitation of the injection treatment of hernia by manufacturers of solutions.

Another status report that must be mentioned is that on Lipocaic, a new pancreatic hormone concerned in some way with the normal transport and utilization of fat. The Council awaits development of further clinical evidence for Libocaic and expressed the opinon that the method should not be recognized for routine practice.

Mention must be made of the excellent report on organic mercurial compounds as bactericidal agents, which states the Council's conclusion that no organic mercurial compound has yet been offered that will guarantee the destruction of spores under all conditions.

Another valuable report is that on the promiscuous use of the barbiturates. This is a continuation of a previous study of the use of barbiturates in suicide. The present study is an analysis of hospital data.

One cannot even glance through a volume such as this without reflection on the great value of the Council on Pharmacy and Chemistry's work, which so richly deserves the support of all who are interested either directly or indirectly in the progress of medicine. Cloth, pp. 181. Price, $1.00. Chicago: American Medical Association, 1941.

ADVERTISERS' NOTES

WHY MEAD JOHNSON & COMPANY COOPERATES WITH THE COUNCIL

Voluntarily, we market only Council-Accepted products because we have faith in the principles for which the Council on Pharmacy and Chemistry (and the Council on Foods) stand.

We have witnessed the three decades during which the Council has brought order out of chaos in the pharmaceutical field. For over thirty years it has stood —alone and unafraid—between the medical profession and unprincipled makers of proprietary preparations.

The Council verifies the composition and analysis of products, and substantiates the claims of manufacturers. By standardizing nomenclature and disapproving therapeutically suggestive trade names, it discourages shotgun therapy and self-medication. It is the only body representing the medical profession that checks inaccurate and unwarranted claims on circulars and advertising as well as on packages and labels.

THE "SULFA" DRUGS

In 1937 sulfanilamide became available generally and proved to be extremely useful in the treatment of infections due to B. hemolytic streptococci and meningococci. In addition, the drug soon was being employed in urinary tract infections, trachoma, chancroid, lymphogranuloma venereum, and certain cases of gas gangrene, and it demonstrated some benefit in gonorrhea, undulant fever, and actinomycosis. Approximately two years later sulfapyridine was being widely used in the treatment of pneumococcal infections and was found to be more effective than sulfanilamide against gonococci. After only another year sulfathiazole began to replace sulfapyridine because it was as effective against pneumococci and gonococci, more effective against staphylococci, and occasioned fewer reactions. In urinary tract infections sulfathiazole was superior to sulfanilamide in most cases. Now sulfadiazine is being introduced and it has the advantage of a lower index of toxicity, which makes possible the maintenance of high blood levels.

This group of drugs has become exceedingly widely employed. Soon there will be only a small proportion of the general population which has not received one of them as treatment of some variety of infection (South. M. J. **34**:1214, 1941). It behooves the physician to choose carefully the most specific and least toxic one for his case. A wide variety of dosage forms have been made available by Eli Lilly and Company.

THE BORDEN COMPANY ACQUIRES MULLER LABORATORIES

The Borden Company has acquired The Muller Laboratories of Baltimore, Md., producers of Mull-Soy, a milk substitute in fluid form for use in diets of persons allergic to the proteins of cow's milk.

The laboratories will be operated under the direction of the Prescription Products Department of The Borden Company and will continue under the management of Dr. Julius F. Muller.

Mull-Soy, which is sold in drug stores on the recommendation of physicians, is in liquid form in tins of 15½ fluid ounces. It is prepared from soybean flour, soybean oil, dextrose, sucrose, calcium and sodium salts. It has been in production since 1936.

Dr. Muller obtained his B.S. degree at Rutgers University in 1922, his M.S. at the same institution in 1928, and his Ph.D., also at Rutgers, in 1930, following a Walker-Gordon Fellowship.

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Silver Picrate, Wyeth, has a convincing record of effectiveness as a local treatment for acute anterior urethritis caused by Neisseria gonorrheae.[1] An aqueous solution (0.5 percent) of silver picrate or water-soluble jelly (0.5 percent) are employed in the treatment.

1. Knight, F., and Shelanski, H. A., "Treatment of Acute Anterior Urethritis with Silver Picrate," Am. J. Syph., Gon. & Ven. Dis., **23**, 201 (March), 1939.

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A REPORT FROM MRS. INGRAM

Dear Co-Workers:

After spending three months out on the west coast this past summer, Dr. Ingram and I returned too late for the first district meeting which was held in Tallahassee on October 2. I am sorry to have missed this meeting as I understand that the ladies assembled for the purpose of organizing. We are anxious to have an auxiliary in District A and hope it can be organized next year.

The November Journal contained information regarding the meetings in Districts B and C, held at Gainesville and St. Augustine, respectively.

BARTOW DISTRICT MEETING

The meeting of the Southwest Medical District Auxiliary was held in Bartow, October 31. About 20 ladies were present at the business meeting which was held in the Civic Center. Mrs. W. J. Barge, State Auxiliary president; Dr. Walter C. Jones, State Association president, and Dr. Gilbert S. Osincup president-elect, attended and gave inspiring talks. They really made us feel we should go forward in this worthy work.

Four new members-at-large were added to the roll, giving them affiliation with the state and national organizations and helping our scholarship fund. Mrs. C. Griffin of Tampa and Mrs. H. G. Nix of Tampa were re-elected chairman and secretary-treasurer, respectively, for the coming year.

Mrs. L. L. Lancaster, general chairman, and her associates entertained the visitors with a tour and a delightful party in the attractive Civic Center. Bridge and games were enjoyed and several lovely prizes were awarded the winners. Later the ladies joined their husbands at dinner.

ORLANDO DISTRICT MEETING

The meeting of the South Central District Medical Auxiliary was held in Orlando on November 1. Mrs. Walter Page of Cocoa, chairman, was not present so your General District Chairman took charge of the meeting. Mrs. W. J. Barge, state Auxiliary president, and her daughter were guests at the meeting. Mrs. Barge is to be commended on her interest in this work.

A tour was taken in the early afternoon to Mead's Botanical Garden, where several lovely orchids were in bloom, one of which measured nearly 8 inches across. According to Professor Grover, this particular plant had been removed from the tropical jungles of South America just two weeks previous to the bloom. On the return trip, tea was served at the home of Mrs. Gilbert Osincup on beautiful Lake Sue. Mrs. J. S. McEwan poured and Mrs. Carl Hoffmann, Mrs. V. Frankfurth and Mrs. Charles Collins assisted the hostess in caring for the guests.

In the evening a banquet attended by the doctors and their wives was held in the Orange Court Hotel, following a social cocktail hour.

These district auxiliary meetings can be helpful if the ladies will attend. At district meetings of the garden clubs and at sectional meetings of women's clubs and other organizations, wonderful things are achieved. We can do the same at these district meetings if you will only attend and help. If all county auxiliaries would appoint or elect delegates to attend these meetings and if several state officers and committee chairmen would attend and discuss the different phases of the work, I believe interest would be stimulated and attendance increased. The members of the Southwest District Auxiliary are planning a definite program with a panel discussion for their next year's meeting. Women who join pay $1.00 dues and become members at large. Thereby they help the scholarship fund and become affiliated with the state and national organizations.

Dr. Walter Jones, president of the State Medical Association, suggested that we collect data

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on the lives of some of our beloved deceased doctors so that a record might be compiled of our pioneer doctors. These data should be sent to the chairman of archives who will forward them to the Medical Association. The Gainesville Auxiliary adopted this work as its project one year. The medical organization in that county is, I believe, one of the oldest in the state.

Our slogan is "Every Doctor's Wife in Health Defense", so join up somewhere and help.

Sincerely,

CAROLYN F. INGRAM (Mrs. L. C.)
General Chairman of Districts.

INDEX TO ADVERTISEMENTS

THIS ISSUE

Allen's Invalid Home	260
American Optical Co.	260
Attwood, J. K., Pharmacist	304
Brawner's Sanitarium	256
Camel Cigarettes	262, 263
Combs Funeral Homes (Ambulance)	305
Convention Press	304
Cook County Grad. Sch. of Medicine	258
Davis, R. B. Co. (Cocomalt)	255
Ferguson Funeral Home (Ambulance)	305
Florida Medical Directory	256
Hand, Carey (Ambulance)	305
Holland-Rantos, Inc.	303
Hoye's Sanitarium	258
Hygeia	256
Kyle, S. A.	258
Lilly and Company, Eli	264
Mead Johnson & Co.	308
Medical Writing Service	301
Miami Retreat, Inc.	258
Miami Surgical Co.	258
Natl. Tuberculosis Assn.	305
Palm Beach Biltmore Hotel	261
Parke, Davis & Co.	257
Petrogalar Laboratories, Inc.	254
Physicians Casualty Assn.	256
S. M. A. Corporation	299
Southeastern Optical Co., The	305
Sun-Ray Park Health Resort	260
Surgical Supply Co.	301
Tucker Sanatorium, Inc.	306
Upjohn Co., The	259
Wyeth & Bro., John	301

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